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CONTENTS

Mainframes: The big four 9

Software: Battling the giant 13

PCs: A good living in the shadow 19

Manufacturing: What IBM got for $22 billion 31

Marketing Contractor program 38

Peripherals: The world of the PCMs 39

Disk drives: Case study 40

Role of departmental processors 41

Product File: Tape Drives 43

SNA: Third-party offerings 47

Publishing: IBM's systems approach 48

Productivity: Working with IMS/DC 49

Added value: Important role for Unix 51

XA: Overtaken by technology 52

Operating systems: VM on the 9370 53

Benchmark: Putting DB2 to the test 54

Living under the IBM umbrella

Graeme Philipson looks at life in the shadow of Big Blue

THE REST of the computer industry has a love-hate relationship with IBM. IBM attracts enormous respect for its complete professionalism. Its marketing, its internal discipline, and the quality of its service and its staff are legendary.

At the same time, IBM is often criticised as arrogant and secretive, and as being far too protective of its dominant position in the market. Its products are attacked as being not the most technically advanced (though there are notable exceptions), and it has become a truism to say that IBM is a marketing company first, and a computer company second.

All of these things are partly true, but none of them gives the full picture. IBM, by virtue of its history, size, and corporate philosophy, occupies a unique place in the data processing industry, in Australia and worldwide. It provides a focus for the industry. It is large enough for many of its standards to dominate, but not so large that they monopolise. It is conservative enough to provide stability, but not so conservative that it restrains progress.

IBM is big. Depending on how you measure it, IBM alone comprises 25 per cent to 40 per cent of the DP industry. In important areas, such as mainframes, it completely dominates. In 1986 IBM became the first computer company in Australia to exceed $1000 milion in revenues. Its revenues of $1025 million were larger than those of its four greatest competitors combined.

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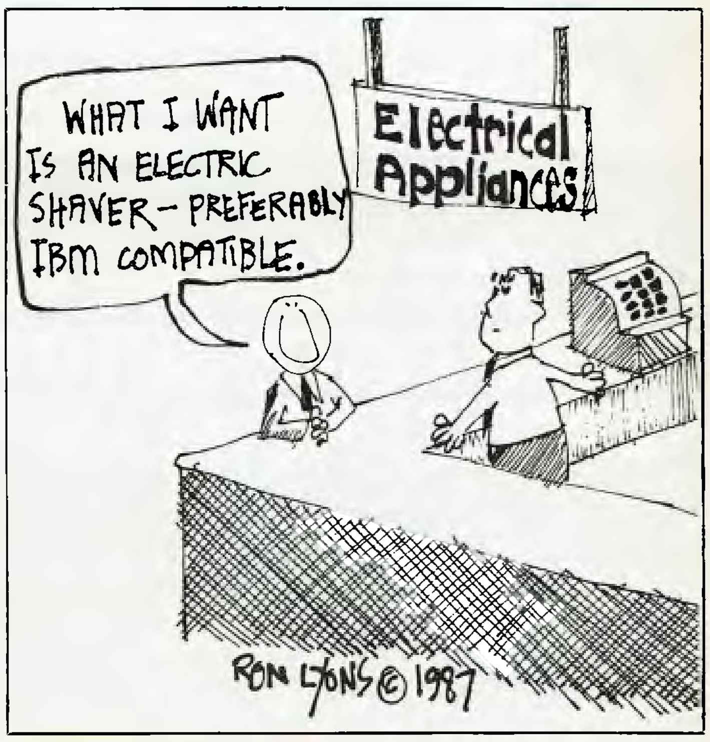
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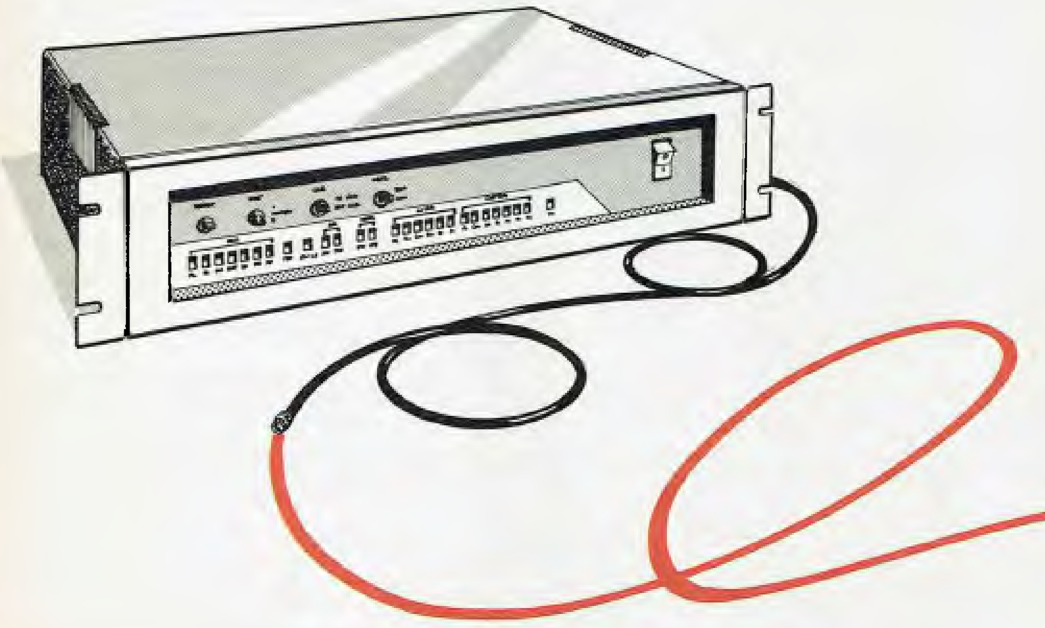

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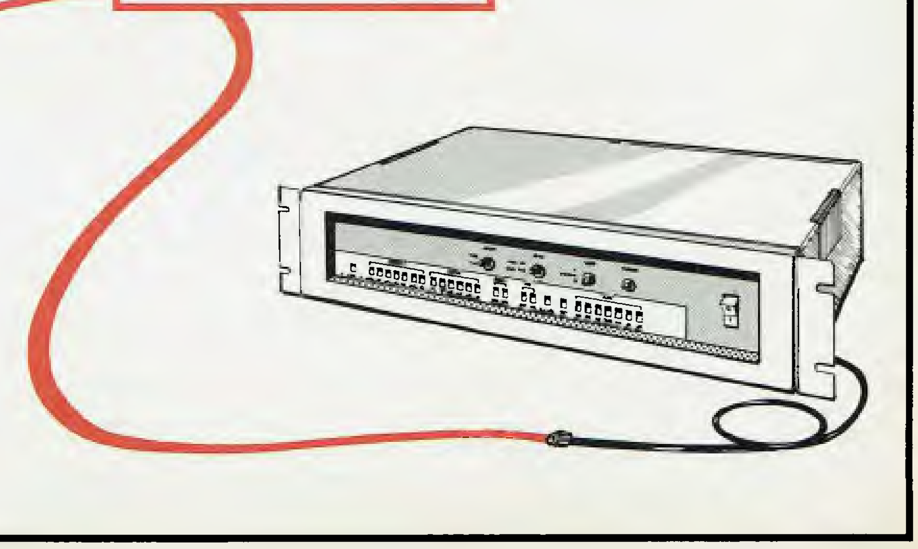

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Living under IBM's umbrella

(Continued from page 3)

Worldwide, IBM's 1986 revenues were $US51,250 million, in the same league as Exxon and General Motors. Measured by market capitalisation (the market price of all a company's shares), it is the world's largest company. IBM's profits are more than DEC's revenues.

IBM in Australia is comparatively smaller than it is in the US, or worldwide. But in the past decade IBM Australia has been more successful than IBM worldwide, approximately doubling its share of corporate revenues from 1 per cent to 2 per cent, to the extent that IBM Australia is now the tenth largest IBM subsidiary in the world.

IBM's size has meant that many IBM standards become de facto industry standards. While many international bodies, such as the IEEE, the CCITT and the ISO, attempt to define standards, IBM has set its own.

Other companies have followed IBM's lead. In most cases, the original intention was to allow their equipment to be connected to IBM's, but often the standard became bigger than IBM. The most important of these IBM standards are in the areas of mainframe and microcomputer architectures, and in communications.

IBM's Systems Network Architecture (SNA) has become a major standard for connecting computer systems. Many have seen it has a rival to the ISO's Open Systems Interconnect model, and for many years it was. But now IBM is openly talking of co-existence with OSI, to the extent that it even says that SNA is its implementation of OSI.

SNA has certainly had more success

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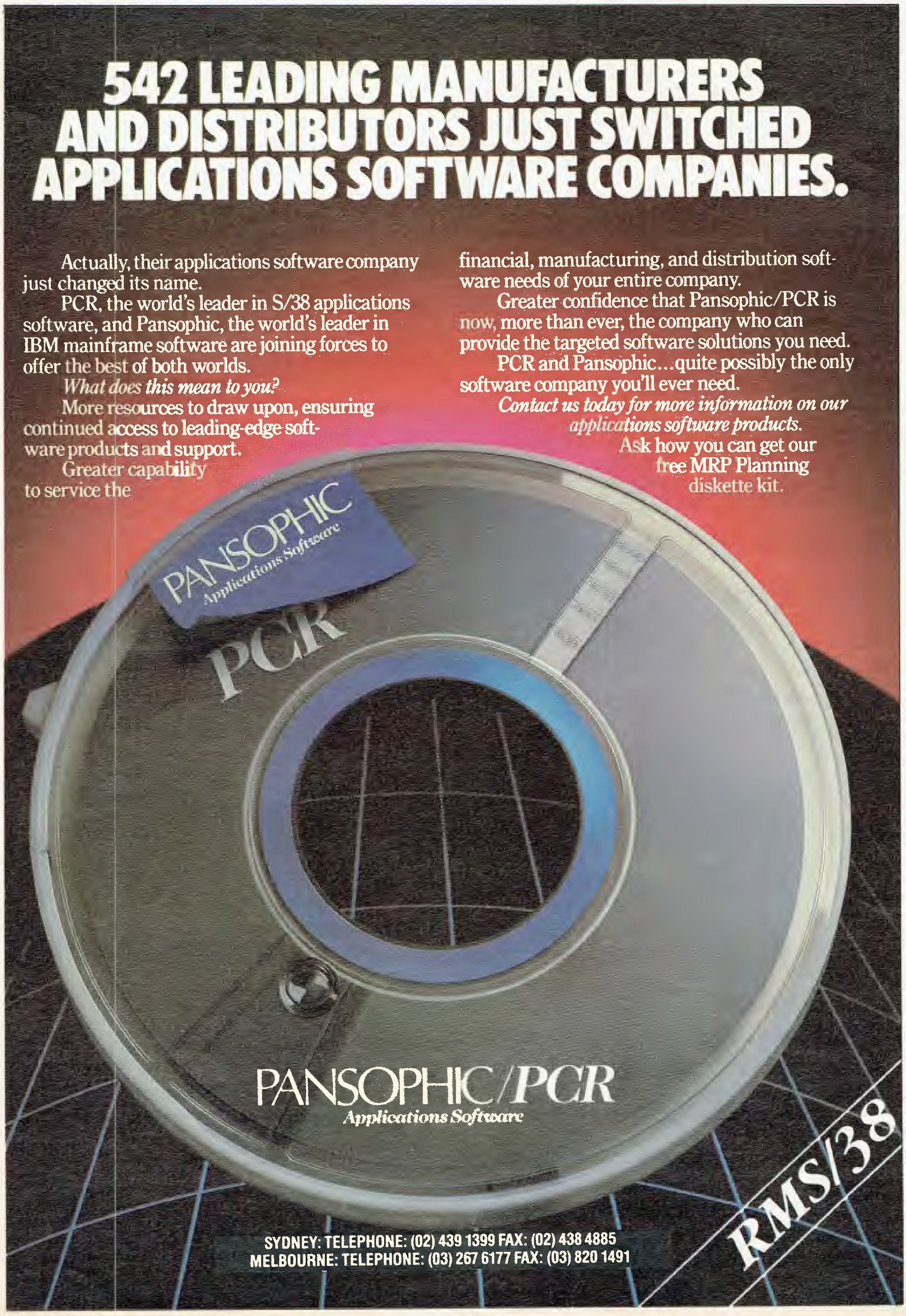
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Living under IBM's umbrella

(Continued from page 4)

than OSI, if only because SNA already exists, while OSI is still being defined. SNA's use as an industry standard is evidenced by the Department of Social Security's Stratplan network, one of the world's largest SNA networks. Stratplan connects 11 Amdahl mainframes and over 70 Wang VS minicomputers, with barely a piece of IBM equipment in sight.

IBM's networking standards are being extended beyond the master-slave relationship originally envisioned for SNA. APPC (Advanced Program to Program Communications), SAA (Systems Application Architecture), and a bewildering array of physical and logical units (PUs and LUs) are being added to the networking lexicon as IBM extends SNA to all machines and applications.

It is instructive to watch the speed with which competitive vendors claim their ability to co-exist with these new IBM standards, and also to watch the constant efforts of IBM to assure the rest of the computer community that it is in favor of standards, and that its new developments fall within the ISO's guidelines, and are compatible or have gateways to more general industry standards.

IBM has had less success in extending its standards into local-area networking. Its Token Ring network is only just taking off, partly because of IBM's delays in announcing key components of it. In the meantime, more fully featured standards such as Ethernet have continued to dominate.

> ***'IBM's major failing is its . . .lack of success in departmental computing'***

IBM's standards have become dominant in mainframe computer architectures. There are competitors with IBM's 370 architecture, but they are struggling and losing market share against the combined weight of IBM and the plug-compatible manufacturers (PCMs).

The major PCMs are NAS and Amdahl, whose systems are essentially straight copies of those from IBM systems, usually offering better price-performance. Added to these are Fujitsu, very strong in Australia, and Nixdorf.

Fujitsu is loth to be called a PCM, preferring the label "applications compatible", but it draws its clients from the IBM camp and successfully walks a thin line between full compatibility and its own architecture. Nixdorf provides machines compatible with the 4300 series, the lowend of IBM's 370 architecture.

The main competitors with IBM's mainframe architecture are all in decline. Burroughs and Sperry have merged to form Unisys. Honeywell has had to merge with Bull and NEC to remain alive. NCR has virtually disappeared from mainframes except for banking applications, where its machines are invariably part of an IBM network. Control Data has suffered major financial reverses and is virtually finished as a commercial mainframe supplier. And ICL, UK's great white hope, is struggling to maintain its market share.

The main competition at the highend is not from these traditional mainframe suppliers, but from the new breed of superminis, particularly the DEC Vax, but also Prime, Gould, Tandem and Pyramid.

IBM standards have dominated microcomputing since the release of the IBM PC in the early 1980s. The issues surrounding "IBM compatible" microcomputing are well known to all with even a passing interest in the subject, but the issue has been greatly clouded recently with the release of IBM's PS/2 range of machines.

The consensus among analysts is that the PS/2 will become a similar standard to the PC. The two architectures will coexist for a few years, but as the OS/2 operating system is ported to other machines ("applications compatible" micros), and other manufacturers copy the PS/2's architecture to varying degrees, the PC and AT and its compatibles will go the way of the Apple II. In the meantime, many microcomputers have followed their own standard, such as Compaq and the other 386 machines. But these will most likely prove to be an evolutionary deadend.

IBM's major failing in recent years is its relative lack of success in departmental computing. It failed to foresee the growth of minicomputers, allowing vendors like DEC, Wang, Prime, Hewlett-Packard and Data General to become major market forces. While never threatening IBM's overall dominance, these vendors are IBM's equals in midrange systems.

IBM's many disparate minicomputer architectures, and its slow realisation of the methods needed to sell into this part of the market, have added to its minicomputer woes. But even with these handicaps, it is a major minicomputer player, with its var-

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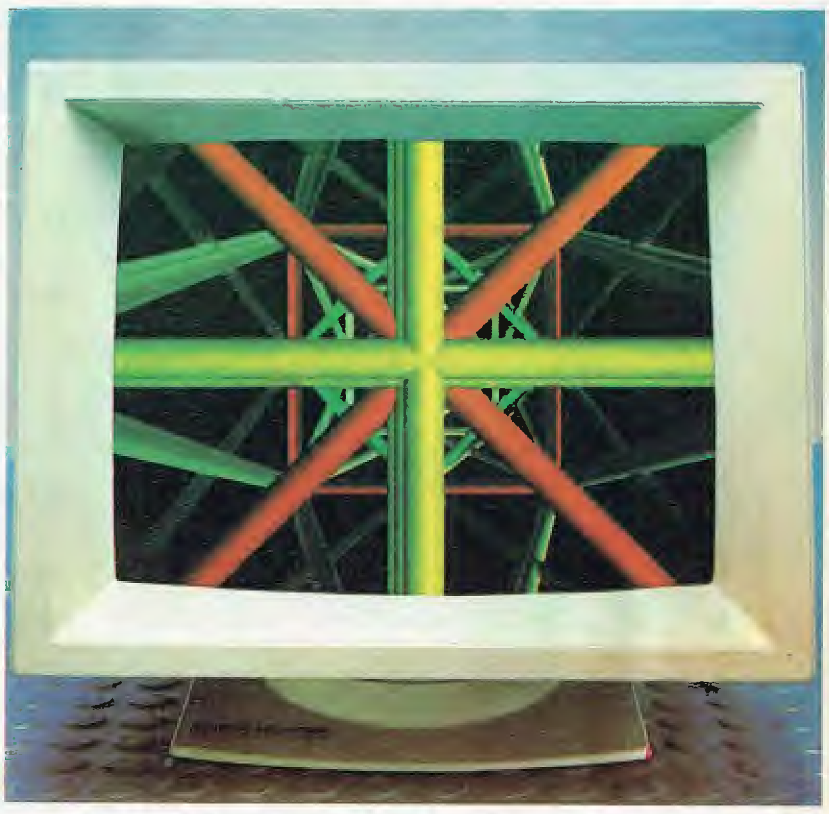

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Living under IBM's umbrella

(Continued from page 7)

ious S/1s, 8100s, S/34s, S/36s, S/38s all enjoying a market share that would be regarded as quite healthy for any other vendor.

And now IBM has released the 9370, a midrange processor based on the 370 architecture. At the time of writing, the first 9370s are being delivered in Australia, where they seem set to repeat the enormous success they are enjoying in the US.

IBM is nothing if not a keen competitor. Before the 1980s, its traditional attitude to competition was to ignore it, but this has changed substantially in recent years as the computer industry has become more complex. To grow at the same rate as its upstart competitors, IBM has had to move substantially beyond its traditional corporate mainframe base. To appeal to these broader markets, it has had to modify its marketing style substantially. While cynics have said that the only company-wide IBM standard has been its blue suited sales force, it has diversified its marketing to an enormous extent.

One of IBM's distinguishing features has been its ability to move remarkably quickly for such a large organisation. This has been possible because of its high degree of internal discipline, and has allowed it to respond to market trends, or change directions for other reasons, with remarkable speed.

In the early 1980s IBM realised that to attack many of the new specialised vertical markets then emerging, it would be better served by forming relationships with other organisations better equipped to deal with those markets. In Australia and elsewhere, it introduced a range of schemes in which it co-operated with other suppliers, large and small, to market IBM products to virtually every organisation or individual who needed or wanted a computer.

It enlisted Vars (value-added resellers), Vads (value-added dealers), Vams (value-added marketers) and CMOs (complementary marketing organisations) to form a network of dealers and resellers of IBM equipment, most of them "adding value", usually applications software.

This move was a major change for an IBM that had previously ignored such organisations. It was quite a shock to many of them, and to many within IBM. But it was forced by necessity, as computers became cost-effective tools in virtually every business application.

The smaller the application, the more likely it is that IBM has left its marketing to a third party. Even in large accounts, virtually all PCs are sold by third party dealers, as are many of the S/36 minis. Third party dealers also sell S/38s and even 4300 machines, depending on the application.

IBM continues to modify its marketing strategy to suit the times. A good example of this occurred just last month. As the relative importance of hardware has declined, and that of software grown, IBM has found that it is missing a major share of the mainframe applications software market, dominated by independent vendors.

> ‘ *One of IBM's distinguishing features has been its ability to move quickly for such a large organisation* ’

In July, to increase its presence in this market, IBM formed a new Applications Systems Division (ASD) as part of a long-range plan to became a major supplier of mainframe applications software. The ASD will co-ordinate all future software development, and be responsible for acquiring application software in key market areas such as office systems, computer-integrated manufacturing, and financial systems.

The ASD will seek to develop applications in competition with, or develop strategic alliances with, traditional applications software suppliers such as Cullinet, MSA, Computer Associates and McCormack and Dodge.

IBM, more than most other computer companies, keeps one eye on the long term. It analyses and acts upon major strategic shifts in the industry, usually turning them to its advantage. While it failed to foresee the enormous growth in departmental minicomputers in the 1970s, it did not repeat the mistake with the micros in the 1980s.

Nor is it likely to make the mistake in the future. It is ensuring that it has all its networking bases covered, and the formation of the Applications Systems Division should provide fair warning as to its intentions in that area.

IBM is doing its best to ensure that its umbrella covers all the computer industry. Like it or not, that will remain the case for at least the next ten years.

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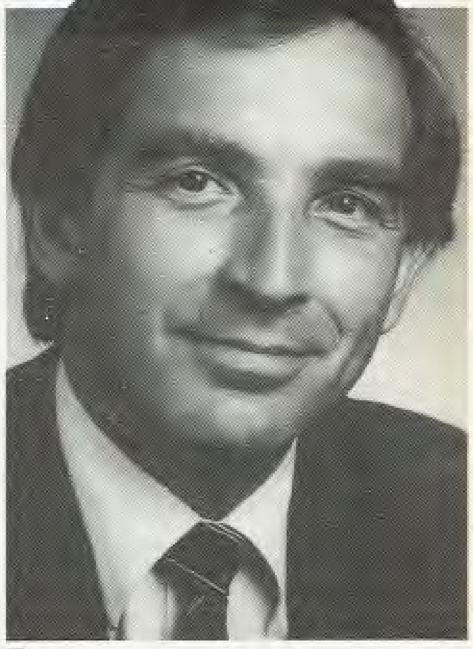
The big four who play IBM's game

Those who survive the game try to outstrip Big Blue in everything it does. Peter Scott reports


■ *David Miller . . . structured view*

MAINFRAME manufacturers who chose to exist under the huge span of the IBM umbrella have selected an immensely harsh environment for their operations. That blue umbrella may help shield some recessionary rain, but it also casts a vast, sometimes stifling shadow in sunny times. In order to survive, those companies must do better than IBM in all their activities, yet they cannot be seen to be too different from the giant.

The fortunes of those who would seek to exploit the ongoing business of IBM's massive installed base wax and wane. Some notable efforts have faded completely from sight, those who survive have adopted a rigorous campaign to outstrip IBM in everything it does.

The constants are change and unrelenting pressure from IBM. As the list of players has altered, so have the strategies of those still on the ball, and with those strategic variations has come a far reaching change of attritude from the user community, a change that itself spurred further changes from the IBM compatible manufacturer.

The upshot is that users — even those who view life through blue-tinted glasses — can reap benefits simply by acknowledging the presence of compatible systems.

In 1987 the field of mainframe vendors operating in the IBM environment in Australia is restricted to just four companies: Amdahl, National Advanced Systems (NAS), Fujitsu and Nixdorf.

One, however, can be described adequately by the once definitive term of plug compatible manufacturer (PCM). The closest is NAS, whose managing director David Koch explained that the company's definition of compatibility is that "you can attach to a NAS machine any hardware that attaches to an IBM mainframe and run any software that runs on IBM".

> ***'Fujitsu has shown perhaps the greatest move away from the old PCM definition, for IBM compatibility is now just a small part of its overall business'***

For Jim McDonald, Amdahl Australia's managing director, the term PCM is a total misnomer: "We are definitely not plug compatible". Amdahl has no commitment to IBM's architecture or technology, he explained. Rather its compatibility comes through software and Amdahl's dedication to IBM's MVS and VM operating systems.

Fujitsu has shown perhaps the greatest move away from the old PCM definition, for IBM compatibility is now just a small part of its overall business. It also supplies mainframes with its own operating systems and other software such as teleprocessing and database management systems. Neville Roach, Fujitsu's general manager of marketing, explained that as long as MVS is a de facto industry standard Fujitsu will provide compatibility. But he added the proviso: "We will also provide compatibility with our own operating systems so customers will be protected."

For Nixdorf, compatibility with IBM appears to be an aberration of the late 1970s that it now cannot easily rectify. The decision to seek compatibility with IBM's VM was made when the company needed a mainframe style machine to run its highly regarded Comet software, which was overtaxing the 16-bit 8870s it then ran on. The

(Continued page 10)

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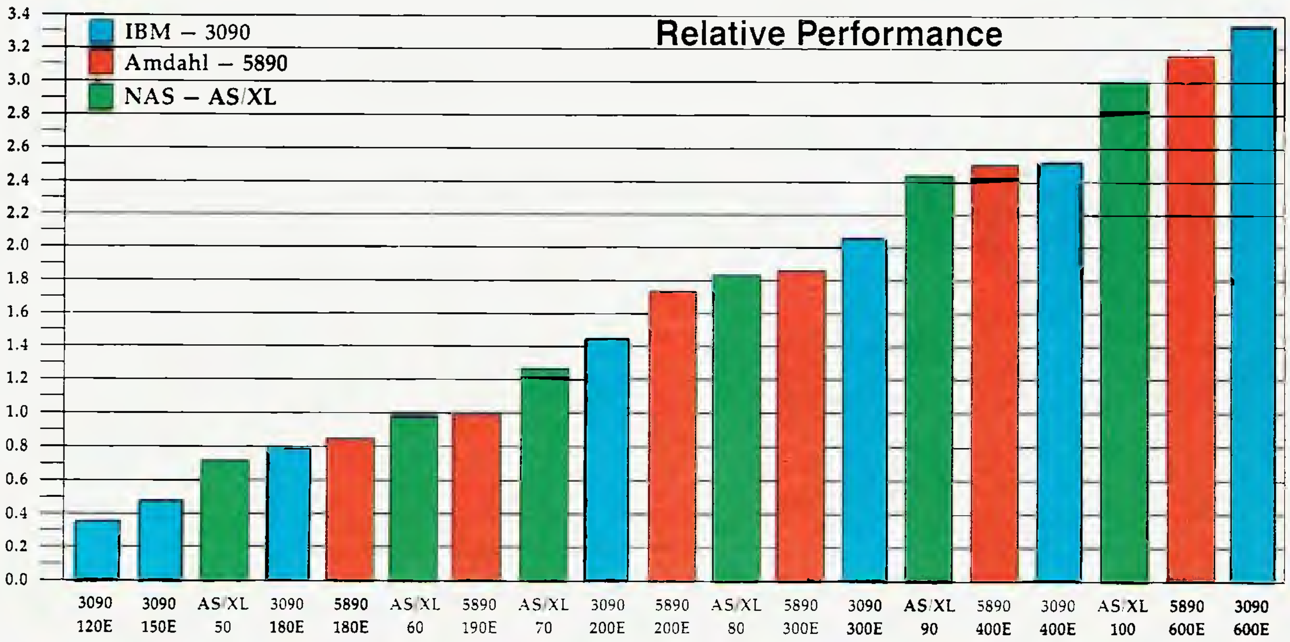
The big four who play the IBM game

Nixdorf will not guarantee long-term compatibility because 'IBM could make it impossible for us to stay'



(Continued from page 9)

decision was taken at that time to use the VM operating system to port the software to the third party mainframe. Nixdorf has taken IBM compatibility no further than that, and expresses no desire to expand its involvement. Topend operating systems like MVS are not on the agenda.

David Miller, managing director of Nixdorf Australia, said the company now has a much more structured view of IBM compatibility than it did three years ago.

The game has changed since 1979 and Nixdorf's commitment now is to what it sees as true industry standards, such as Unix and Open Systems Interconnect, which have begun emerging in force only in the 1980s. The company has a solid base of users, however, who are tied to Nixdorf's 8890 and IBM style operating systems and it does not wish to lose them. For those users alone Nixdorf will maintain IBM compatibility. It will not guarantee how long that policy will remain in force because it recognises that "IBM could make it impossible for us to stay in there".

> ‘ *DP will accept a feature lag of between six and 18 months . . . but there is a danger if the performance lag is too long* ’

And the power of IBM over its own environment can indeed be one of the limiting factors for the compatible manufacturers. They are keenly aware that they have chosen to operate in IBM's most profitable sector and that they will never be given any latitude — that is not IBM's style.

As long as IBM calls the shots it governs all changes to its hardware and software and, more importantly, it has absolute control over the pace at which those changes will be implemented.

Koch defined some of the difficulties this control can cause his company. "We are always late, there is an intrinsic feature lag," However, Koch believes that as long as the data processing community remains reasonably conservative this need not be a problem — provided the wait is kept to a minimum. "DP will accept a feature lag of between six and 18 months because they believe the balance is safety," he maintained. "But there is a danger if the performance lag is too long."

Indeed, to succeed a compatible manufacturer must be light on its feet and quick to react. But if users must wait for

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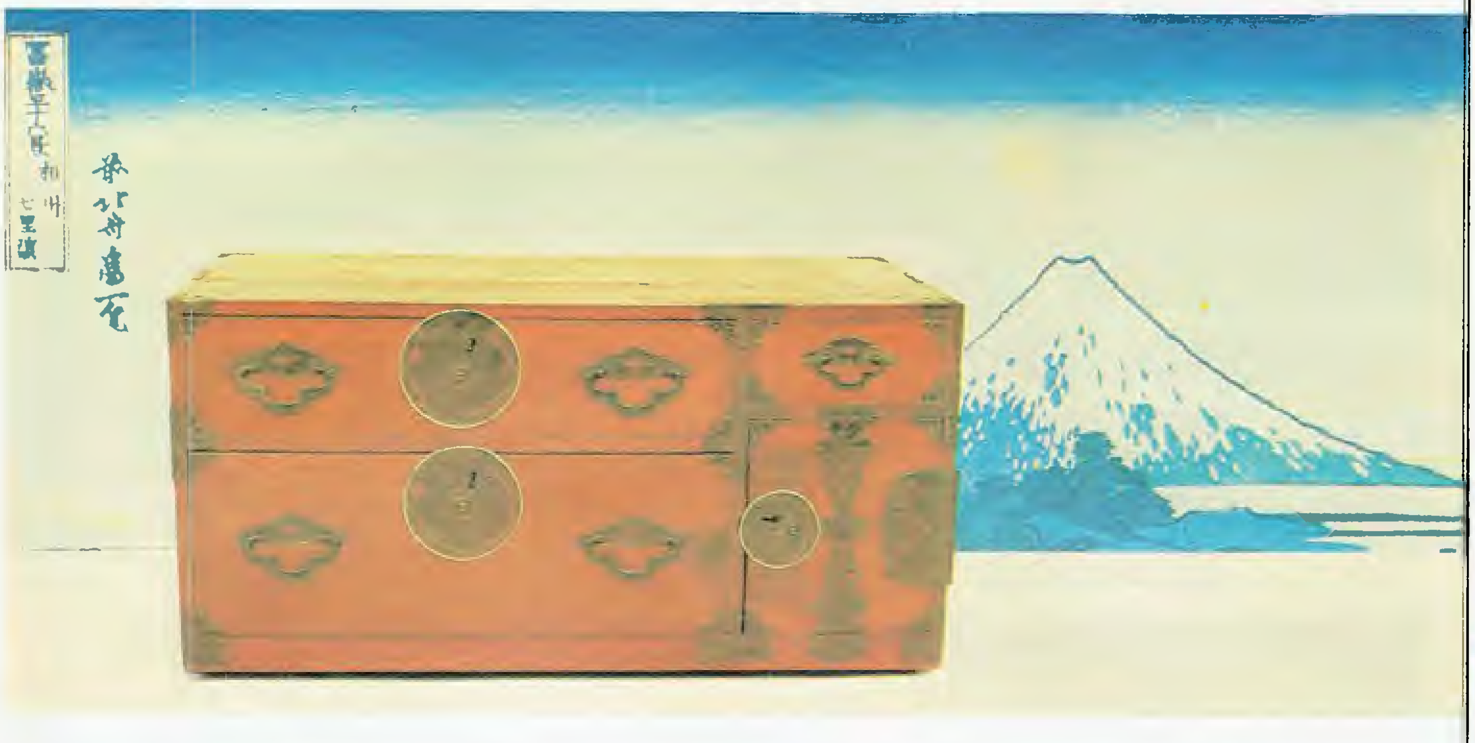

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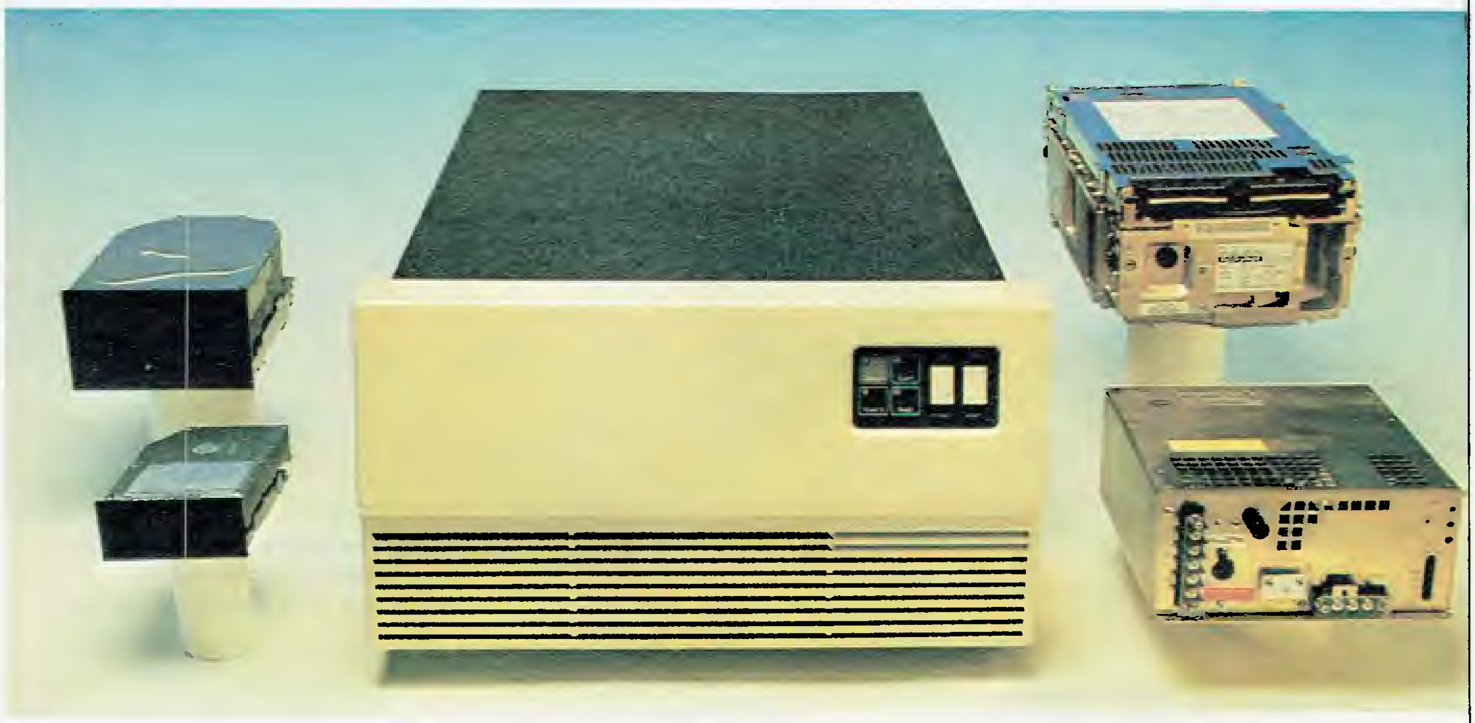

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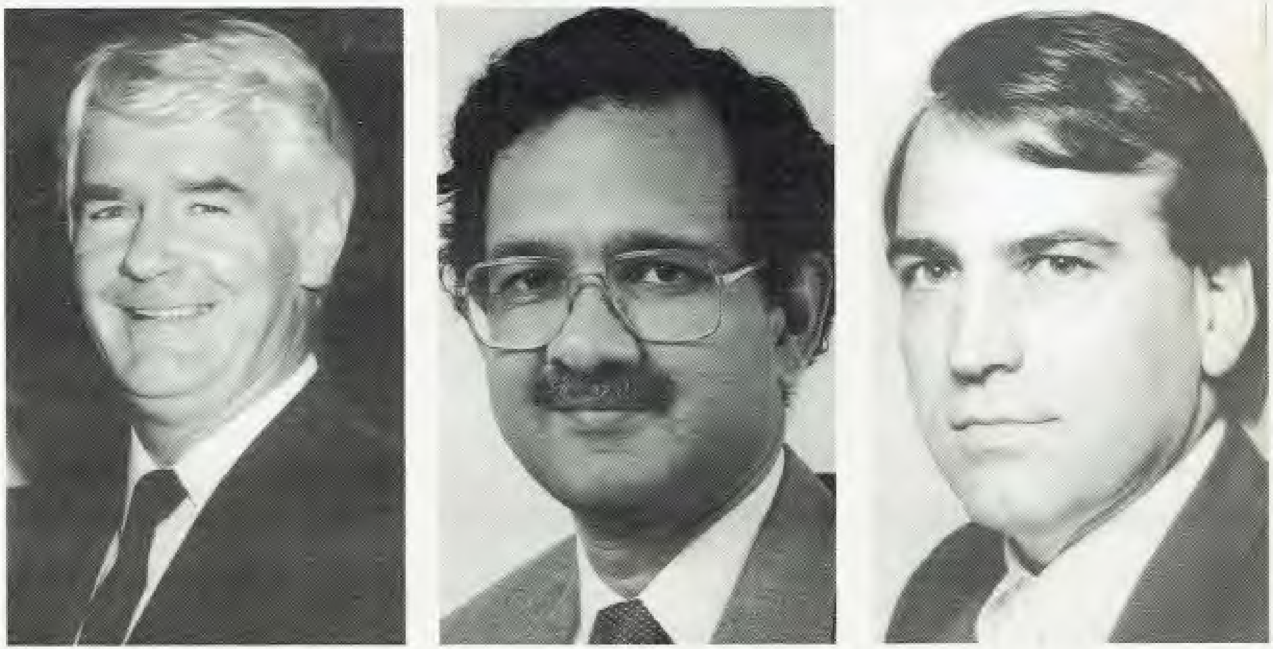
Big Blue sets the pace for its opponents

Amdahl, NAS and Fujitsu are all hell bent on outgunning IBM. Power and technology come first.



■ *Jim McDonald, Neville Roach and David Koch . . . ability to offer a complete package 'vital'*

the compatible suppliers to play catch-up with features, there is no need to suffer a power crisis. Amdahl, NAS and Fujitsu are all hell bent on outgunning IBM in the Mips department.

Power and technology come first, compatibility follows. Koch claimed that his company's hardware supplier, Hitachi, worked to build the most powerful and reliable computer possible and added the microcode later. "We have to be ahead to be behind," he commented.

Fujitsu takes a similar path, but as Roach pointed out, not all is plain sailing."Sometimes we have to do things twice. If we have an advantage that we want to offer to customers and IBM has not released a product, we may well release a version and later do a compatible version." As an example Roach said that Fujitsu had introduced 31-bit addressing and then had to offer a second version of it that was compatible with MVS/XA.

He was emphatic, however, that performance was the primary goal. "We don't hold up releases. We will and do release advanced products that are not compatible."

McDonald claimed that IBM's control of change and of the pace of that change could not be regarded as limiting the advances his company could offer. "It's Amdahl's strategy to have faster CPUs than IBM and have better performance than IBM." That Amdahl was prepared to lead was demonstrated by its implementation of the Multiple Domain Feature, which preceded IBM's VM/XA/SP with Multiple Preferred Guest by several years, McDonald said.

With their product strategies firing, the major compatible manufacturers can demonstrate the ability to compete with IBM in their own right, albeit it is just one small niche of IBM's operations. That change has only been possible because there has been a change of attitude in the user community. Where once the compatibles were regarded as names that could be used once in a while to keep IBM honest, now each of the compatible manufacturers has its own loyal user base.

The change has not come quickly or easily: in the computer industry reputations are won only on performance.

"We must strive for excellence all over — in price, performance and support," said McDonald. "If Amdahl's price-performance ratio was only as good as IBM's or if our service was only as good as IBM's we wouldn't get by."

NAS too is keenly aware of the importance of high quality service and support as an integral part of a total package. It was a lesson learned in Europe where NAS was not only selling against IBM, but was offering the same Hitachi hardware as BASF

(Continued page 12)

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		1980 %	1985 %	1986 %	RANK
1	IBM	33.9	35.5	35.1	1
2	HIS	12.1	5.5	4.8	6
3	BURROUGHS	10.5	6.5	6.5	4
4	ICL	8.5	3.4	2.8	8
5	SPERRY	8.3	5.0	5.2	5
6	CONTROL DATA	5.7	2.7	1.8	11
7	FUJITSU	5.4	13.7	18.6	2
8	DEC	4.4	6.9	6.8	3
9	NCR	3.8	3.4	2.7	9
10	AMDAHL	1.1	3.1	4.3	7
11	HP	1.1	1.5	1.6	12
12	DPNT	1.0	0.7	0.6	15
Others including					
WANG			1.3	1.6	12
CONCURRENT			0.8	0.7	14
DGEN			1.5	1.4	13
NAS*			2.1	2.1	10
PRIME			2.8	2.7	9
OTHERS			3.6	3.7	
		100.0	100.0	100.0	

* Note: NAS did not start selling large systems until 1981.

IDC AUSTRALIA

IBM sets the pace for its opponents

(Continued from page 11)

and Olivetti, and now as Comperex. "NAS learned to compete out of necessity. We got into value added service and support and raised it to a first class level," Koch said.

In addition all three companies offer a complete range of hardware that encompasses CPU and peripherals. All see the ability to offer a complete package as vital to their competitiveness.

In Amdahl's case it was its ability to market Fujitsu peripherals that helped it establish a reputation for high quality and so smooth the way for aceptance of its mainframes in the US.

Fujitsu does not market mainframes in the US, but it too is well aware of the importance of a complete package. "Fujitsu is a total systems supplier with a complete range of peripheral and terminal products" said Roach. "But there is no element of our product line with which we don't compete with IBM. Offering a total alternative is a sound strategy that gives the user complete freedom of choice."

It also makes sound business sense. As Koch noted, good turnover in peripherals helps balance the books. "With NAS, the peripherals business is now as big as the systems business", he noted.

Being able to compete with IBM on the grounds of performance, backup and features is one essential element that these three manufacturers have mastered. But they must still compete with IBM for the customer's attention.

That task is made easier once reputations are established, but IBM still holds several aces. "IBM people used to tell users you couldn't have air-cooled mainframes, or Amdahl couldn't make a profit", said Amdahl's McDonald.

"We had to work very hard to overcome that. But at the user level there is still some FUD (fear, uncertainty and doubt) that the IBM people are able to exploit," he claimed. While FUD may be on the wane, aggressive pricing from IBM is not.

"Since IBM threw away the price book in the UK there is no country where it now sells at list," noted Koch. "But fighting discounts is business as usual."

McDonald agreed. "Whenever Amdahl bids for a contract, IBM will knock 20 to 40 per cent off its list price — they need to come down 20 per cent just to come in on even terms."

The message to IBM users is loud and clear, if you really want to test the market, include a tender from a compatible manufacturer.

In McDonald's words: "There is nothing wrong with buying from a single vendor, but everything is wrong with a single bidder policy — it's tragic."

The 9370 lifts veil on future

Noel Bennett sees portents in speeded-up delivery

THE installation of the first 9370 in Australia, ahead of previously indicated delivery dates, underlines the importance which IBM places on this strategic product. John Clemenger Advertising took delivery of the product from media and legal bureau service specialist, Infomatics, some weeks ago.

Yet, it was only in July that IBM Australia suggested that the machine would be released here in the fourth quarter, as originally scheduled. This quickened delivery time ties in with developments in the US, where IBM is accelerating some delivery schedules by up to six months.

US reports also suggest that besides the hardware the 9370 will become one of the key products in IBM's future directions because of the range of software which will become available.

The reports say that IBM has indicated that it will offer MVS/XA on the Model 90 with a CICS offering under VM later this year. Such enhancements would belie the initial response that the 9370 was only "a Vax killer".

Subsequent developments would also indicate that fending off DEC is but a small part of the overall role assigned to the 9370. Organisationally, the machine can be perceived as acting as a system for small businesses, as a distributed system for large organisations and as a standalone system within departments, running independently of the DP centre.

But as the software availability indicates, the true importance of the 9370 can be interpreted as IBM's intention to bring coherence into its present disparate product lines — the products ranging from the PS/2 and System/36 and 38 to the 4300 series, as well as the 3090 mainframes.

Again it would not surprise if the mooted Silverlake series, a common replacement for the System/3X models, eventually allowed progress towards the 9370.

Raft of products

However, while future products lines will have this 9370 commonality in operating system, IBM has also concentrated on connectivity. It has released a raft of products in the communications field within the past six months to ensure easier connectivity between its products.

If computers are now regarded as merely a device that is attached to the end of a communications line, communications becoming the over-riding factor, then having a commonality of products which share the same operating system makes the issue of connectivity so much easier.

These developments may be summed up by interpreting the 9370 as showing that System 370 architecture is IBM's thrust for the 1990s.

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Software vendors versus the giant

Third-party vendors have healthy respect for IBM, as Stewart Fist reveals

■ ***Denis Healy . . . 'IBM is always a threat'***

AS ROME discovered when Hannibal attacked in 216 BC, it is not easy to do battle with the elephant. But as Hannibal learned to his cost, pachyderms are independently minded animals and, when they decided to go their own way, sometimes it was his own soldiers who were trampled underfoot. It is much the same with IBM.

Third-party software vendors in the IBM arena have the same healthy respect for a giant; a respect that varies from a close working relationship to cynical distrust. They need to run close alongside and they benefit from the size, but there is always the risk of getting trampled.

Robert Goodwin, marketing manager for Management Sciences America (MSA), believes his company has "a very close relationship with IBM in the US" with perhaps a little less contact in Australia.

Outside of IBM, MSA is the largest independent mainframe applications software company in the world and its tie to IBM is close. At MSA's US headquarters in Atlanta, it has a lot of IBM horsepower for research and development and runs all IBM operating systems and database management systems.

> ***'To us it is only a vague potential threat. We coexist very well with it because we do not compete head-on in Australia'***

"IBM has spoken in the recent past about its entry into the applications software market," Goodwin said. "We have not seen it yet — but I guess it is a warning." There is always a risk with IBM. It is so large and influential in the marketplace that anything it does immediately becomes a threat to the current incumbents.

"But to us it is only a vague 'potential threat'. At present we co-exist very well with it because we do not compete head-on in any field — at least in Australia."

Denis Healy, managing director of Cullinet, views competition from IBM in the opposite extreme. Cullinet's clients are predominantly large corporations, and State and Federal government departments, and in these areas he believes IBM and his company are "strong competitors".

"IBM is always a threat," he said. "Our primary product area is in database management software, 4th-generation languages, and pre-written software application packages for the IBM corporate environment.

"But we have an advantage over IBM, analogous perhaps to the advantage DEC has over it in hardware: just as DEC offers an integrated hardware line, we offer an integrated software line, and IBM cannot compete with this."

Healy believes that large companies and government organisations are increasingly looking to get real returns from their investment in software. So integration across the three hardware platforms together with integrated database management systems, 4GLs and applications software, is becoming a very attractive propositon.

"In that way we are way ahead of anything IBM has to offer," he said. "IBMS/R is our mainframe database management product and it is up against DB2. But we also have ADS, our 4GL Application Development System, and IBM is not at all

(Continued page 15)

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Software vendors vs the giant

(Continued from page 13)

strong in this area. DB2 just does not have much in the way of 4GL tools."

Most of the third-party software vendors I talked to in preparing this article mentioned some threat to their markets from IBM's introduction of DB2. But Betty Bruce of Cincom Systems believes the IBM product actually boosted the sale of Cincom's Supra.

"We are very thankful to DB2, because it has educated a whole marketplace on relational technology and paved the way for Cincom and others with similar products," she explained.

Bruce pointed out that although IBM's DB2 might end up as the de facto standard, Supra has had Ted Codd's seal of approval as being the most relational system to date, and this worked strongly in its favor when genuine evaluations were being made by potential purchasers.

Healy also feels reasonably comfortable now with DB2. "I guess it affected our market in the short term — potential customers waited for a while to see what it was all about," he said. "But from our point of view it only delayed decisions on buying our product, MSR.

"The key to databases is the transaction capability — how many transactions they handle — and our product still has the highest transaction level of anything in the marketplace. DB2 installed on customer sites performs only at 10 to 15 per cent level that MSR is achieving, so people are becoming very disappointed about the end performance of DB2.

> ***'If it squeezes hard enough we will just pop out somewhere else under another rock'***

"What IBM has done is to create a situation where a lot of organisations are talking about having two databases. IBM itself is starting to suggest that companies keep their existing IMS products for transaction processing and use DB2 for enduser databases," Healy said.

"When IBM promotes a two-database environment there are opportunities for us. Many companies immediately consider Cullinet's products in these circumstances."

John de Angeli, Pansophic's general manager feels that his company is even more insulated from IBM moves into the software area. "All our products are database independent," he said, "so when a product like DB2 comes along we just produce a fairly inexpensive interface for it. For instance, we can just swing a new front-end on to a product like Easytrieve and we are back in business.

"My thinking is that IBM is probably more interested in moving into the areas of large applications software. It now markets Hogan in the US — but it is not going to worry about Easytrieve. And anyway, we can produce products faster and less expensively, and market them better than IBM can. If it were to produce something that competes with Easytrieve, we would just go off and build something else. If it squeezes hard enough, we will just pop out somewhere else under another rock."

Of the eight third-party software vendors I spoke to, all but two had MC (Marketing Contractor) agreements with IBM. These are formal commission agreements for the sale of medium-system products — 370s, System/36 and System/38. The agreements come in two different forms. At one level the company can undertake to handle both hardware and software installation itself and, at the other, it works in a partnership with IBM, each handling one side of the installation.

The larger companies, like MSA, sometimes work one way and sometimes the other, depending on potential problems with the sale. "Our medium-systems group will register a prospect with IBM, and then it will either join with us in selling hardware and software or we will sell both," explained Goodwin. "We are acting as an agent in these cases and getting a commission for the hardware sales — in the System/36 and /38 areas only. With big systems IBM does all the selling itself, and we only deal with the software."

The relationship between hardware suppliers and the individual software vendors seems to depend to a large degree on the mutual value each gains from the MC agreements. There is also substantial value in official and unofficial referral from IBM and the other hardware suppliers.

"The people at IBM know about our products, and we probably get quite a lot of unofficial help and some indirect referal, but we would not know about these unless the clients told us," de Angeli said. "We

(Continued page 18)

■ *John de Angeli . . . 'insulated'*

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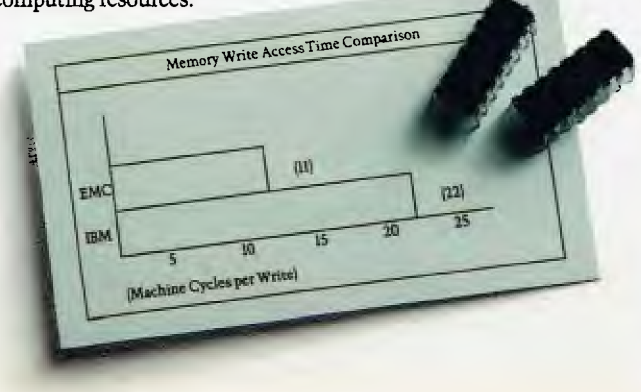

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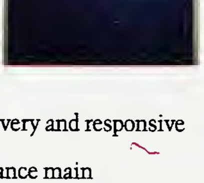

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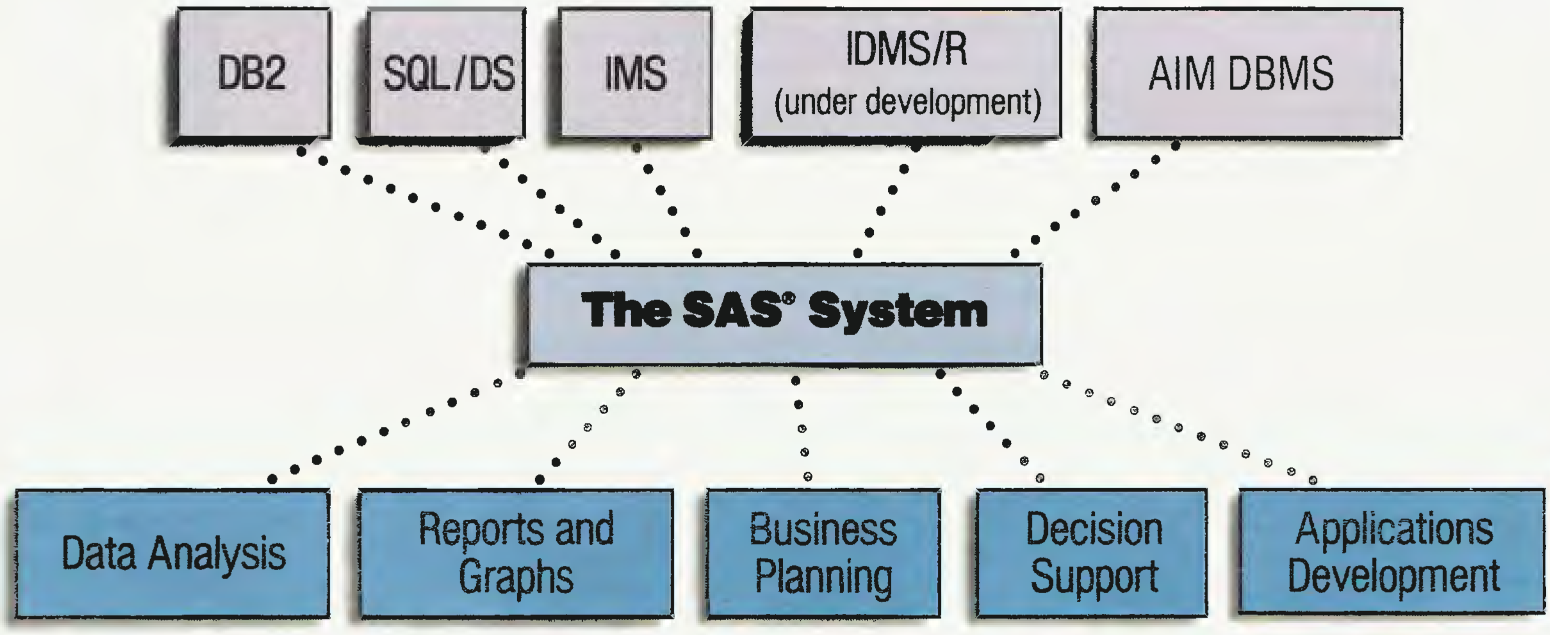

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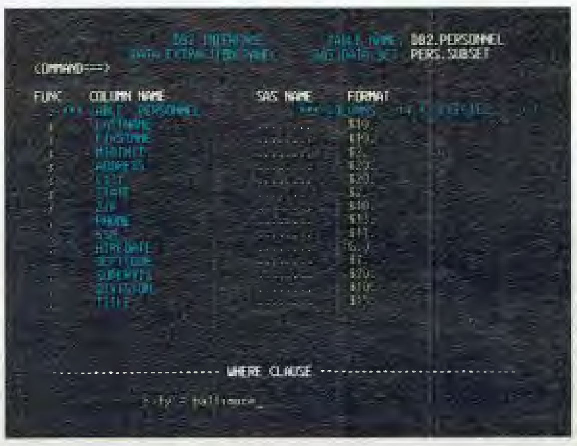

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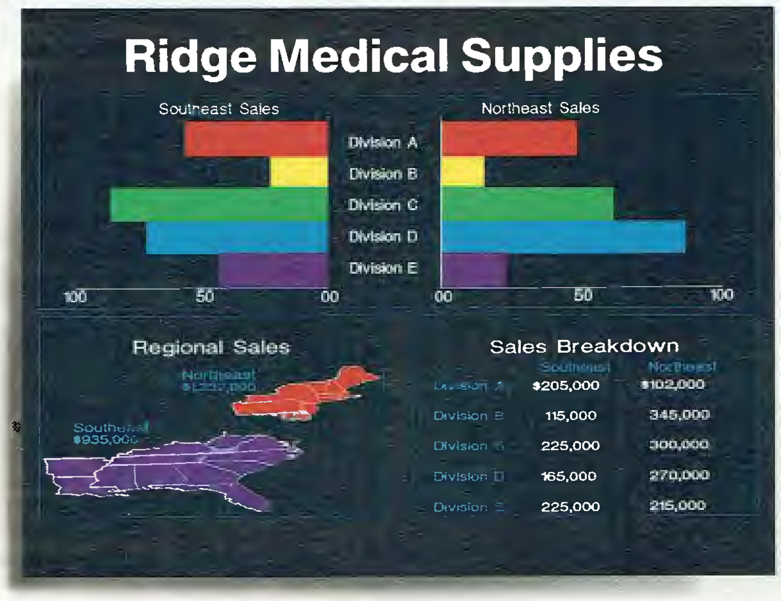
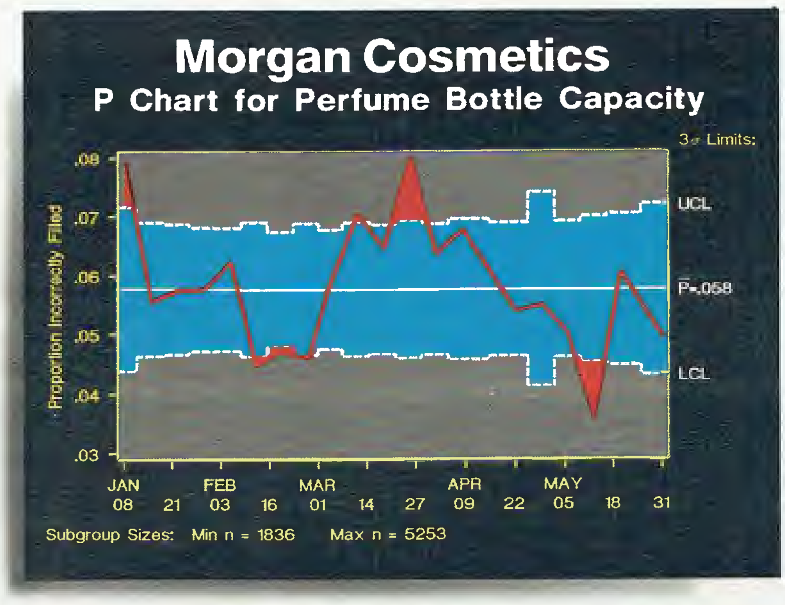
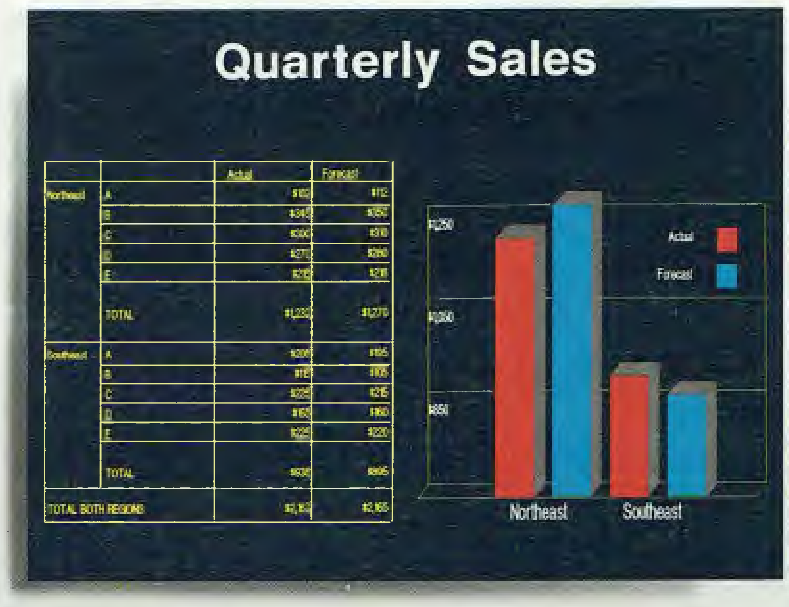
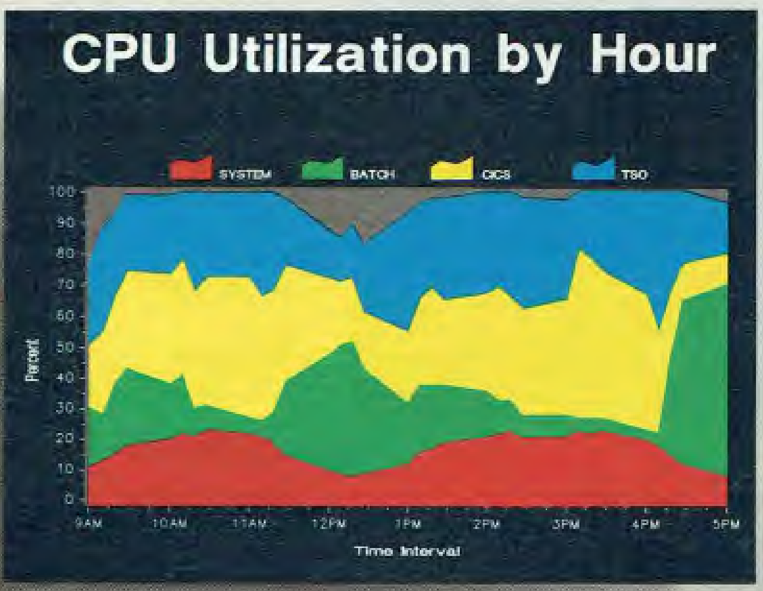


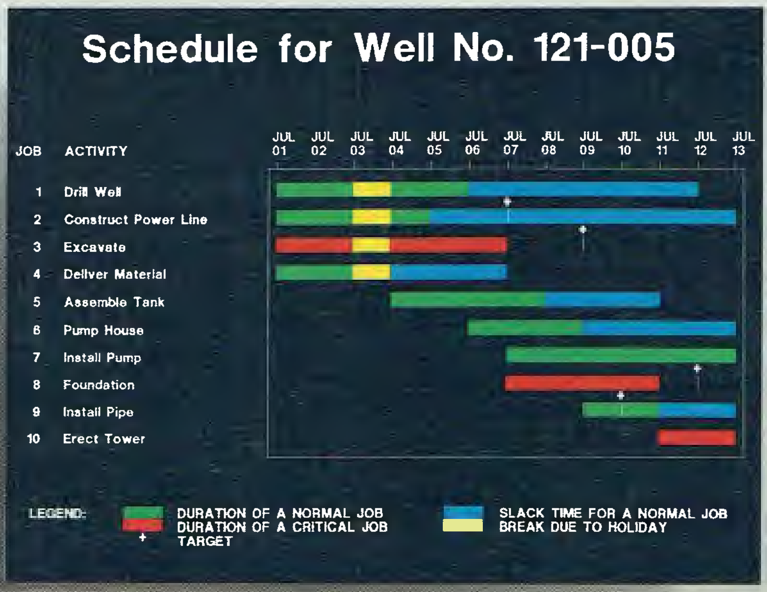
	Southeast	Northeast
Division A	$205,000	$102,000
Division B	115,000	345,000
Division C	225,000	300,000
Division D	165,000	270,000
Division E	225,000	215,000





		Actual	Forecast
Northeast	A	$102	$112
	B	$345	$350
	C	$300	$310
	D	$270	$280
	E	$215	$218
	TOTAL	$1,232	$1,270
Southeast	A	$205	$195
	B	$115	$105
	C	$225	$215
	D	$165	$160
	E	$225	$220
	TOTAL	$935	$895
TOTAL BOTH REGIONS		$2,167	$2,165





JOB	ACTIVITY
1	Drill Well
2	Construct Power Line
3	Excavate
4	Deliver Material
5	Assemble Tank
6	Pump House
7	Install Pump
8	Foundation
9	Install Pipe
10	Erect Tower

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(Continued from page 15)

Software vendors vs the giant

certainly do get help from the non-IBM compatible product companies. They put our company and product names on their library bulletins, and so on. But IBM does not work this way."

Wayne Usher of Neller Software agreed that IBM often initiates business for them. "IBM will often come to us to be part of a joint tender if we have the right software," he said. "But the other companies do this also. Our client base is varied in hardware — particularly in mainframes; IBM has 40 per cent of our sites, with DEC next and then Wang.

"DEC has got its act together and is coming up as far as we are concerned. We probably have a closer relationship with DEC than we do with IBM on a day-to-day basis."

Computations has a close working relationship with IBM, according to account manager Chris Hodgeman. "We have products for life insurance companies, finance companies, leasing, wholesale banking, and so on, none of which IBM has," he said. "So if our products require IBM hardware we are aiding the IBM salesforce, and they see us as someone to work with, rather than against.

"I cannot see IBM taking on vertical markets such as ours."

This theme was echoed by most of the companies that I spoke to. Most felt confident that IBM would not constitute a serious threat to their markets in the foreseeable future because of the sheer amount of time and experience necessary to produce a competitive product.

"This is not the sort of business you can get into overnight," Goodwin said. "Our software has been developed and enhanced over a period of many years. You cannot just put 500 people to work producing a purchasing system, for example, and have it functionally sound in six months. It does not work that way.

"You need other practical inputs. Software is not written from the ground up, it evolves over a period of time. So if or when IBM does move into our software area, it will be just another competitor to start with, but it will become more of a competitor as the years go on and its software has a chance to mature."

Usher agreed. "IBM coming into the marketplace does not worry us," he said. "We are specialists in what we do — we do not try to be a jack of all trades. We are primarily involved in payroll and fixed-asset management systems."

On the general question of co-operation and assistance from IBM as a hardware supplier, most vendors agreed that relationships are cool but adequate.

Pansophic's de Angeli probably best sums up this relationship by pointing out that most people in this area have worked with IBM at some time or other. "I was there for 12 years, and I can just pick up the phone at most levels and say 'Listen Jim, you are screwing this one up. Can't we talk?' and 'How's the wife?'."

"Most of the people in the industry know the people of IBM anyway. So if your products do not really take IBM head-on you will be allowed to go on our own merry way. You do not head-butt the elephant."

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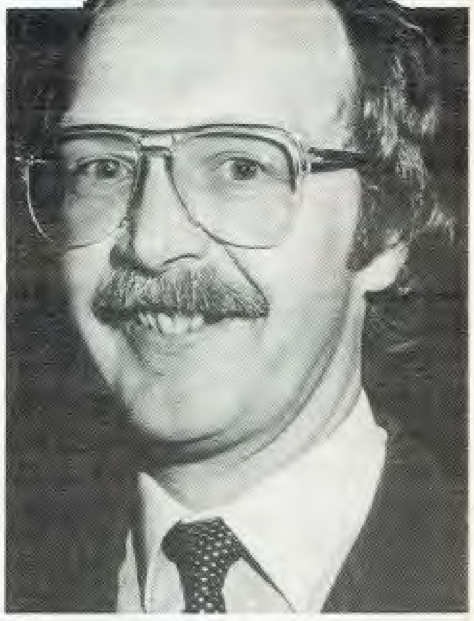
How to live on the giant's leavings

There is a living to be made in IBM's shadow, says Neville Angove



■ ***Millard Lowe..."skills in short supply required"***

ACCORDING to recent International Data Corp (IDC) figures, Australians spent $A2233 million on computer hardware and $A573 million on computer software last year (*Computerworld Australia*, July 24, 1987). By 1990, IDC estimates these figures will be greater than $A5300 million and $A1300 million respectively.

Considering that costs related to the running of computer systems, excluding staff costs, can be as high as 60 per cent of hardware/software costs, then it is obvious that computing is a very big business indeed.

In terms of world figures, Australia probably represents as little as 3 per cent of total computer hardware and software purchases. To say that IBM worldwide has about 50 per cent of the market is to make it a very big company indeed. While IBM's share of the market has been estimated to be as high as 70 per cent in the US, it hovers around the 30 per cent mark in Australia. Since IBM Australia earned just a fraction over $A1000 million last financial year, the IDC figures for total market value could be a little conservative.

While IBM does not have a majority share of the market in Australia, its 30 per cent easily eclipses its nearest rivals overall. Amdahl, the world's leading maker of IBM plug-compatible mainframes, once claimed that if you ignored the major banks and insurance companies then Amdahl was nearly the dominant supplier. Unfortunately for Amdahl, the biggest banks and insurance companies are invariably IBM sites, leaving the also ran with less than 10 per cent of the mainframe market and nothing at all in the mid-range (dominated by DEC) and personal computer (no single dominant manufacturer) market.

> ‘ ***In mainframes there is no significant competition, a situation likely to endure for the foreseeable future*** ’

In mainframes, IBM has no significant competition, a situation likely to endure for the foreseeable future. While Amdahl and Fujitsu can claim a significant percentage of the IBM plug-compatible market in Australia, this is a relatively small share, and is no threat to IBM's major accounts. The other manufacturers, such as Unisys, ICL and NCR, are limited to niche markets in which a particular combination of their proprietary hardware and software can outperform the more generalised IBM systems. A classic case is Tandem's Non-Stop systems, which have found a solid niche in controlling automated teller machines (ATMs).

Effectively, IBM is the standard for general purpose mainframes. Some accounts might move to other vendors, but an equal number come back into the IBM fold. Its success as a mainframe vendor is partly due to its size, the quality of its hardware, and because it sets the agenda for mainframe computing and so has advance knowledge of what it will bring to market.

Manufacturers living in IBM's shadow do better in Australia than overseas, thanks to IBM's slow start in this country (and according to some analysts, because IBM Australia is directed from Tokyo and not allowed to respond quickly enough to mar-

(Continued page 20)

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Living off the leavings

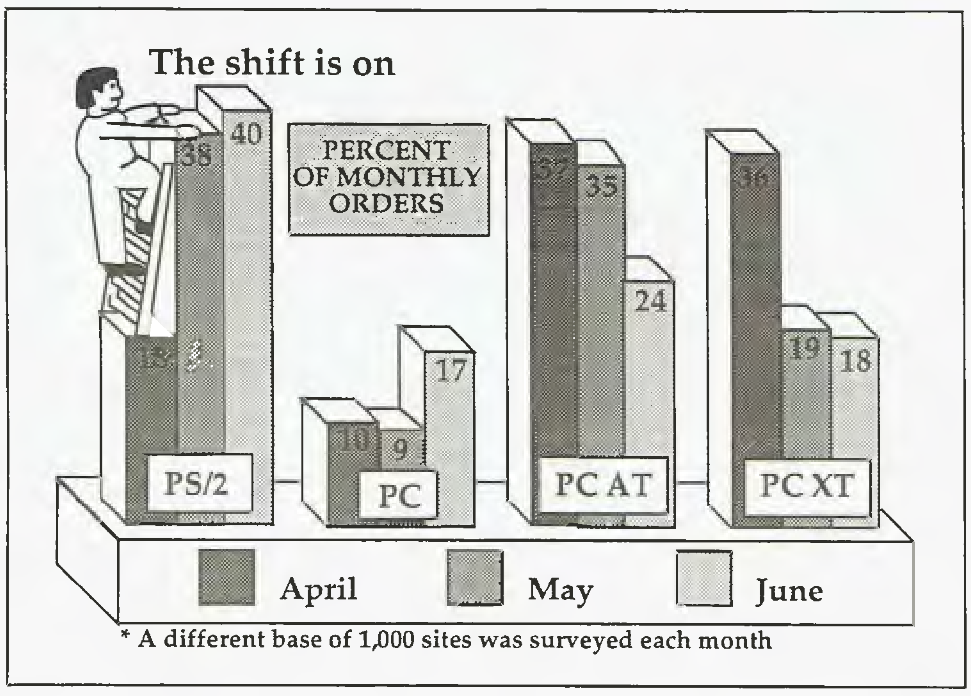
(Continued from page 19)

ket demands). Their main role seems to be to provide an alternative source of supply to IBM, occasionally offering improvements in hardware but most often improvements in software. As well, the presence of plug-compatible manufacturers acts as a price leavening effect helping to maintain some sanity in mainframe pricing.

In the mid-range and minicomputer market, virtually no one lives under the IBM umbrella since there really isn't one. The IBM 9370 series and its like are either matched by System/370 plug-compatibles, or are forced to compete against different architectures combined with different softwares. There is a growing threat from DEC, in the sense that this company is forging links to the SNA environment for its highend systems, discounting the major IBM advantage. Simultaneously, IBM has been forced to compete in this market because of flat sales in the mainframe market, and its inadequacies are fast becoming too obvious.

At the bottom end of the minicomputer range, IBM's System/36 and System/38 once again do not have effective competition from compatibles. The market is either too small to generate a need for plug-compatible systems, or too small to cover the cost of such systems. A change is now occurring in the System/36 arena, where personal computers based on the Intel 80386 processor now rival most System/36 configurations in power. With the addition of System/36 emulation software, they could prove to be a significant threat.

Several companies are investigating bringing to market System/36 "compatibles" as soon as IBM announces its intention to force users to migrate upwards to the System/38. One such potential supplier, Sydney-based Compwell, is well along the road to providing System/36 emulation on its highend Intel 80386-based systems. Managing director Peter Wells, after commissioning an analysis of the System/36 market, believes the specialty software now running on System/36s will port easily to an emulation, and will enjoy a ready market among users who see no need to migrate to more expensive and less satisfactory larger systems from IBM or other vendors.


The shift is on

* A different base of 1,000 sites was surveyed each month

CW Chart: Lisa Romano Information provided by Focus Research, Inc.

The areas in which most of the activity under the IBM umbrella occurs are personal computers, local area networking, and PC-to-host (3270) communications. Products in these areas lend themselves toward a larger range of smaller manufacturers due to the relatively lower cost of designing and manufacturing competing compatible hardware and software. These markets change quickly with products having relatively short lives, and have recently been confused by a dramatic change to personal computer architecture standards.

Any look at life under the IBM umbrella for personal computer and communications products must take into account the effects of the Personal System/2 (PS/2) and Operating System/2 (OS/2) announcements made by IBM last April. Although superficially these announcements concerned only the personal computer and communications markets, which are less than a quarter of the total computer market, they were doubly significant because they signalled a new marketing approach by IBM. They also changed IBM's role as a standard setter in computing (with a great number of after-effects that have still to be analysed. For convenience sake, a number of other changes in the computer industry relevant to these markets can be said to have occurred about that time, so it is a convenient watermark.

Before the PS/2 announcements, IBM held a semi-dominant but waning role in the personal computer and communications industries, with significant threats to its personal computer market by compatible manufacturers, and an inability to get competitive networking and 3270 communications products to market on time.

IBM's share of the personal computer market is an unknown factor, despite numerous surveys that claim their figures are exact. Overall, IDC claims about 1.3 million business personal computers in Australia at the end of 1986, with almost 500,000 more to be installed this year. At the same time, surveys by the Australian Bureau of Statistics (ABS) argue that only 15 per cent of businesses are computerised, and even those still have room for more systems.

The apparent contradiction between the IDC and ABS figures probably lies in the fact that only the largest businesses, such as the major banks, insurance companies and manufacturers, are heavily computerised. Most small businesses are so far untouched by the benefits of personal computers. At the same time, the first machines installed in business are being replaced, with the expectation that more than a quarter of new sales will be replacement systems. This indicates the total personal computer population in business will stabilise around the six million systems mark.

IBM's share of this market has been estimated to be as high as 75 per cent and as low as 20 per cent. At the end of 1986, IDC estimated that only about a quarter of new personal computers installed in businesses and professional offices wore the IBM label, although close to 90 per cent were IBM-compatible.

> ‘ ***The first machines installed in business are being replaced . . . more than a quarter of new sales will be replacement systems*** ’

Figures supplied by Compass Research for May 1987 sales show IBM with a 43 per cent share of the market (for PC-compatibles), a figure inflated by "end-of-model runout" and initial PS/2 sales. Assuming a reasonable degree of accuracy for the Compass Research figures, this means that at least 350,000 personal computers will be sold to dealers, distributors and manufacturers operating under the IBM umbrella. Significantly, most of these are not host or network-connected, but will be in the future. Sales of systems from 1988 onwards will tend to be networked in many sites, but the bulk will not be host-connected unless sold as replacements for outdated corporate systems.

Living under this umbrella was not easy, but 1986/87 saw compatible manufacturers gaining ground on IBM (probably the major reason for the architecture change in the PS/2). The growing market, along with IBM's insistence on overpricing the PC XT and PC AT, helped maintain life in the shadow.

In Australia, the IBM umbrella proved to be good shelter for expansion product manufacturers, with companies such as Hypertec gaining a solid hold in the market by developing high quality products at competitive prices. The aftermarket for PC XT systems, boosting their performance with accelerator cards, was probably the most significant niche for Hypertec, according to marketing manager Merelyn Kelly.

Several manufacturers, such as Computer Corp of Australia (CCA), succeeded in producing whole systems, not just expansion cards, but still required high degrees of imported assemblies. In fact, CCA proved to be a success story in another respect, gaining lucrative government contracts. Another local manufacturer, Impact Systems, developed a range of laser printers based on imported Canon and Ricoh engines but Australian-designed and manufactured controllers.

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A living from the leavings

Success under the IBM umbrella, according to the managing director of Melbourne-based Distributed Data Processing (DDP), Richard Presser, depends on understanding the market's needs and adding value to the IBM product. It is for this reason, according to Presser, that DDP succeeded in gaining more than a 30 per cent market share for its Attachmate range of 3270 communications products. Other factors needed to survive under the IBM umbrella include understanding the IBM agenda, and taking advantage of its inability to do "the perfect job".

System Technology's marketing manager Millard Lowe argues that individual niches under the IBM umbrella require skills in short supply, and that Australian companies have shown the ability to provide those skills when IBM has invariably not been able to do so. Similar sentiments apply to quality software, according to Lowe, with the success of Net/Master being a prime example.

One factor that has helped Australian companies offering 3270 communications products under the IBM umbrella has been the company's inability to provide its own products, and the smallness of the market. Effectively, the IBM giant generally has ignored the mice scurrying around its feet, although not in all cases. The success of Net/Master in providing features that System/370 users wanted, but IBM could not provide, may have been a large part of the impetus behind the hurried development and release of the IBM Netview products. The fact of Net/Master's continued success, according to Presser, is in no small part due to the care and consideration that went into its design and execution. The unstated argument (in this case) is that this could only be done by a small company working under clearly defined standards that are part and parcel of living under the IBM umbrella.

Harsh reality

Life can become interesting, though, when IBM moves its umbrella and leaves the mice standing in the harsh sunlight of commercial reality. This has happened in the 3270 communications arena as well as in personal computing, with a considerable degree of overlap between the two areas.

The April 2 announcement (April 6 for IBM's Asia/Pacific group) of the new Personal System/2 series of personal computers caught most competitors without a reply, although several have attempted to out-bluff the market. The change in personal computing standards brought about by the PS/2 has had a great impact on the Australian market, with the consensus being that the new standards have opened up more opportunities and avenues to meet market demands. Some analysts have argued that no real markets were closed by the PS/2 announcements, rather markets have been given an added vitality, which has not detracted from the possibilities generated by a new product range.

Unlike IBM Australia's reaction to previous US product announcements, the PS/2 announcements were closely followed by the local release of the product. This gave competitors and expansion product manufacturers no chance to have either competing products or added-value products (such as memory and communications boards) ready to take advantage of the inevitable drought of IBM-labelled products. Fortunately, IBM could also not supply such products, and this tended to slow the PS/2's penetration of the market.

Some competitors, such as CCA Systems, have managed to sit on both sides of the fence simultaneously. While publicly supporting the new PS/2 operating system, OS/2, and thereby adhering to the parent company attitude, CCA Systems also presented considerable evidence that OS/2 in particular and the PS/2 in general were not what the market wants or should have. The change in the expansion bus architecture, the change in disk formats, and the new emphasis on multitasking have all been targets of the company's ire.

While CCA Systems' assault on the PS/2 has been viewed by some as an anti-IBM attitude, the truth is that the company is presenting a valid argument along the lines of " . . . if it ain't broken, then don't

(Continued page 22)

Some competitors have managed to sit on both sides of the fence simultaneously

■ *Richard Presser . . . "competition has been savaged"*

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(Continued from page 21)

fix it"! The fact that the company is simply reflecting the beliefs of many personal computer purchasers, including major corporate accounts, that the PS/2 is basically not good value for money, has often been lost amid the claims that CCA Systems is only attempting to maintain its market share. The personal computer market has rallied to the anti-PS/2 cause, if the recent purchase by Shell of NEC Powermate is a reflection of intelligent planning.

The truth is that IBM's attempt to move its umbrella has served to strengthen the standard it established six years ago. By departing from the "standard" PC XT and PC AT architecture, IBM guaranteed that these standards would remain free from its interference. No user of PC compatibles now has to be concerned with the possibility of IBM altering this standard in such as fashion as to outdate any personal computer adhering to it.

A living from the leavings

If IBM had moved completely to the Micro Channel Architecture (MCA) on April 2, and withdrew support for the PC XT and PC AT, it is possible that the fears of the doomsayers would have been realised, and the personal computer market (with attendent ramifications for the host connectivity market) split into two competing standards. Given the fact that the MCA standard is superior in performance and potential to the old PC architecture, the success of competitors in maintaining market share would have been extremely uncertain.

IBM's mistakes were many, but they are obvious only with the clearness of hindsight. The company continued to manufacture the PC AT, even though it was far from satisfied with the product. At the same time, the decision to market the PS/2 product line was made too late for IBM to stockpile sufficient quantities of the machines, except for the PS/2 Model 30 which still supported the old architecture. Effectively the company continued to support the PC standard long enough to allow rational assessment and rejection of the MCA by purchasers — and to allow competitors to take advantage of the drop in pricing of components such as the Chips and Technologies XT and AT chipsets needed to manufacture cheaper but more powerful personal computers that adhered to the PC standard.

The other marketing blunders made by IBM — more obvious in Australia because of IBM's relative market weakness here — were the initial over-high pricing of the PS/2 range (a ploy to trap competitors who designed MCA-compatible systems to sell at a price that IBM could easily undercut), and the late release of the addon products that made the PS/2 competitive with PC-standard systems: host communications hardware and software, memory boards, more powerful variants of the PS/2 such as the Model 60 and Model 80, and the all-unifying OS/2.

Yet another factor not considered by IBM, probably because it discourages its staff from gaining knowledge of competing products, was that the personal computer market in Australia was far larger than it estimated, with more room for competitors to manoeuvre and survive.

The approach taken by a number of companies in Australia — generally different in scope and intensity from approaches taken in the US — demonstrates the range of possibilities available to third parties for living in IBM's shadow, without living under its umbrella.

Peter Wells from PC-compatible distributor Compwell stresses that he is more concerned with being "Compaq-compatible" than being strictly IBM-compatible. His company's product lines include high-powered versions of PC XTs and PC ATs, as well as 80386-based systems that are compatible with expansion cards designed for Compaq's 80386-based systems. For the majority of users, according to Wells, the PC XT and PC AT provide more than adequate performance. For users who need higher throughputs, the more powerful versions of Compwell's PC XT and PC AT systems, as well as the 386-based systems are available.

Not significant

Compwell's ability to supply products for personal computer networking and 3270 communications has developed differently, according to Wells, because IBM's presence in this market has been less overshadowing. When IBM did enter the network market, it did so with an inferior product at an excessive price, and has done nothing since to improve its standing. As a result, competing networking systems offer either compatible and comparable performance at a lower price, or superior performance at an equivalent price. Incompatibility between networking standards is not an issue with Compwell's dealers, according to Wells, since the notion of linking even similar networks is not a significant market requirement.

Other companies have gone different routes as a result of the PS/2, departing even from the PC standard. When IBM announced the PS/2 and OS/2, it effectively killed the need for hardware standards, even for the need for manufacturers to use processors of the Intel 80X86 family. The view presented by Neil Colvin of Phoenix Technologies at Comdex 87, which is shared by many industry analysts, is that there will be an increasing trend towards emulating hardware on Asic and Risc systems. The only uncertainty is in the type of expansion architecture to be offered, and this is still an open question.

One way to get away from the expansion architecture problem is to minimise the need for expansion cards through the incorporation of all essential features on the personal computer's motherboard, just as IBM did with the PS/2. At Comdex 87, South Australian company Micro Byte Systems announced a single board personal computer even smaller than the "baby" PC ATs that have swamped the

(Continued page 26)

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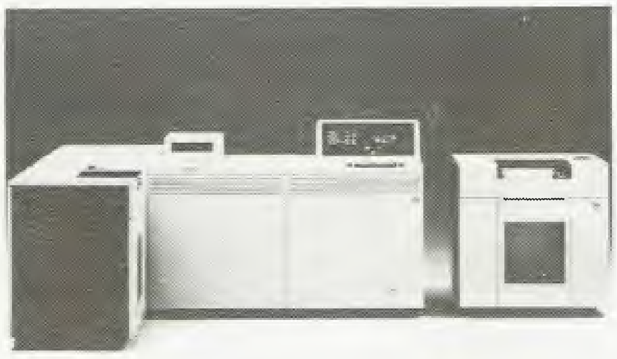

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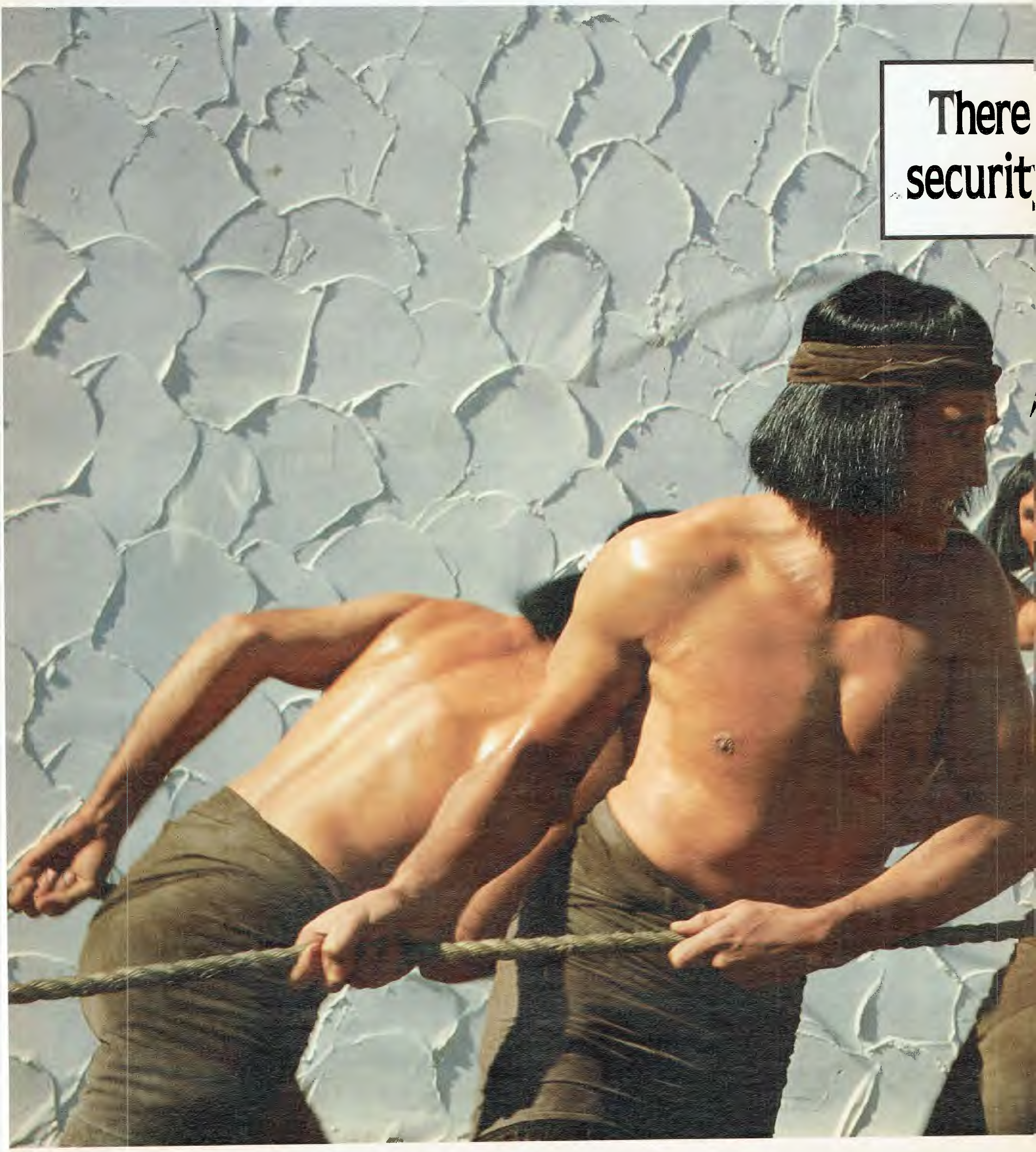

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■ *Hypertec's Merelyn Kelly*

A living from the leavings

> The aftermarket for PC XT systems was probably the most significant niche for Hypertec

(Continued from page 22)

market. According to managing director Gregory Watson, the new computer is designed to compete against the NEC Powermate in performance and the cheapest clone in price, through the use of integrated chipsets such as those from Chips and Technologies.

Other Australian manufacturers, most of whom do not want publicity at this time, are engaged in the development of systems following the PC standard but with added functionality on a smaller motherboard. Newcomer to the personal computer field, Data Sat Information Systems, is developing a high-speed single board PC AT-compatible that is designed to "wrap around" its high speed data modem range, but which will be a true PC-compatible in every respect for those users not currently enamoured of data communications. According to managing director Robert Singleton, the venture would have had only a limited chance of success before the PS/2 announcement, but the "setting into concrete" of the PC standard occurring in conjunction with the release of integrated chipsets and the fall of the Australian dollar have made an Australian-designed and manufactured personal computer a commercial reality.

The contradiction in the effects of the PS/2 announcements on Australian companies living in IBM's shadow are more apparent — and apparently more confusing — in the areas of data communications, networking and host connectivity. In these areas the new architecture has muddled an already confused market, and given more clout to IBM as the only company that has the knowledge to call the shots.

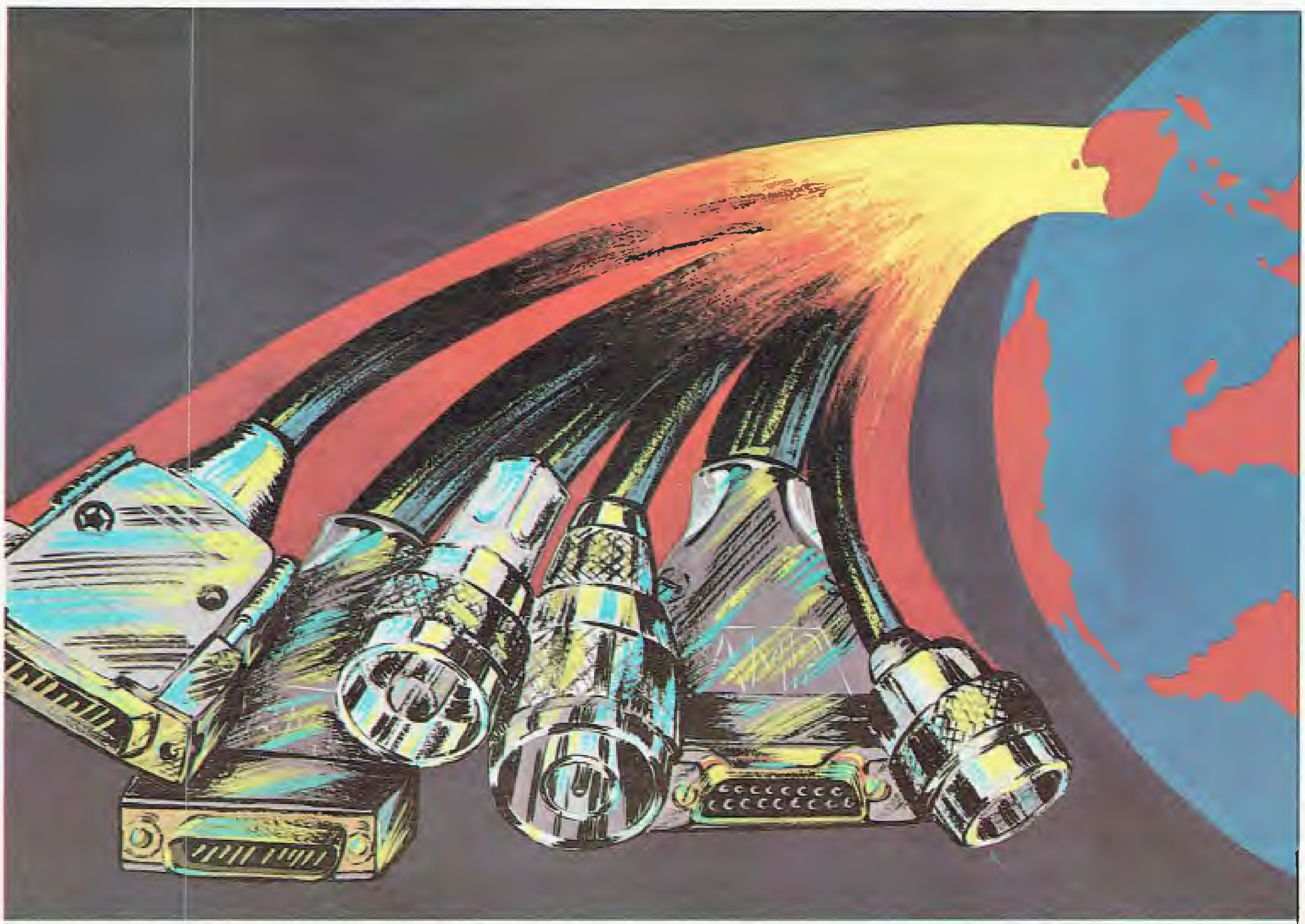
At the bottom end of the communications market, data modems, manufacturers now have two distinct hardware standards to support. According to Singleton, the trend towards internally mounted modems has seen a significant delay as manufacturers wait for the relative strengths of the PS/2 and PC-standards to become clearer. This trend should see an alternative path developing with the release of more powerful and lower costs modem chip designs that allow the incorporation of a modem into the personal computer motherboard design.

The middle of the communications market is personal computing networking, dominated by Novell's Netware variants and IBM's Token Ring. The PS/2 announcements did very little for IBM's standing in this market in Australia, partly because it could not supply sufficient PS/2 hardware to satisfy demand and partly because its improvements to the Token Ring Lan Manager software did very little to boost the real throughput of the network.

> ***'The long-term future of third-party vendors in the 3270 communications market is probably unchanged'***

The companies living under IBM's umbrella have enjoyed high sales since the PS/2 announcements, in spite of the lack of PS/2 compatible hardware. In a frenzy of mixing and matching components distributors such as Data Peripherals and Imagineering have added value to IBM networks through the use of purpose-designed file servers to replace its inadequate options, and by running more efficient Lan managements software on top of an IBM hardware backbone. At the same time, these companies have promoted alternative networking solutions completely based on non-IBM hardware and software (but not non-IBM in that these systems do follow the PC standard).

IBM's continued inability to get its act together in communications is most evident in personal computing networking, an area in which all of its competitors have enjoyed significant success. But in personal computer to host communications, IBM's



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dominance of the core of the network — the host and associated communications controllers — has made some inroads into its competitors' share of the shadowed lands.

DDP's Richard Presser believes the PS/2 announcements have actually increased IBM's share of the 3270 communications market, but fortunately for his company this increase is not as large as it might have been and has been gained more at the expense of other vendors. The competition has been savaged and saved by the PS/2, according to Presser, with serendipity playing a critical role.

The absence of competing PS/2 MCA communications boards to IBM's own severely affected third-party competition, which should have given IBM a much larger share of a fast growing market. Unfortunately for IBM, the delay in its release of its own hardware and software still left some market opportunities open for companies such as DDP to sell either its Attachmate hardware or software to run with either IBM software or hardware respectively. The continued demand for PC XT and PC AT systems also helped third-party vendors, since they still had products available for these systems.

■ *The new IBM PS/2*

According to Presser, the long-term future of third-party vendors in the 3270 communications market is probably unchanged in spite of the PS/2 causing a temporary slump in sales. Most companies who are aiming at almost total host-PC connectivity are still in the early stages of implementation, and those third-party suppliers who gain an early presence in these companies and maintain it through quality products and an understanding of the customer's needs, may reap the rewards in the coming years. The System/370 standard has remained unchanged, with only the level of sophistication of both IBM and third-party products being increased. The future beyond OS/2 is an open question, though.

Living in the shadow of a giant can be risky, but it is obvious that a giant the size of IBM is of little threat to its Australian competition, provided that the competition is sufficienty fleet-footed. Growth is virtually guaranteed, in spite of the absence of direct light (or perhaps because of it).

Living under the IBM umbrella has provided the necessary standards for manufacturers to either adhere to or ignore (that is, improve on), while protecting those companies from the harshness of the elements.

The announcement of the PS/2, instead of moving the umbrella as the giant turned to a different direction, actually caused the size of the umbrella to expand. The growing personal computer market, the fall in the Australian dollar, the development of cheaper and more efficient technology, and IBM's own blunders, have all contributed to a strengthening of the IBM aftermarket. The existence of two hardware standards, linked by a single family of operating system and applications software, has expanded the horizons for manufacturers, marketers and users alike, without removing the protection afforded by the IBM umbrella.

As long as IBM is content with a major share of a big market instead of total domination of a smaller market, those companies living on IBM's leavings — or often living by snatching a living from under its nose — will continue to survive and prosper according to their ability to operate under the usual business guidelines. The only inefficiency that IBM tolerates is its own.

● *Neville Angove is principal of the consulting company, Neville Angove and Associates, which advises on the acquisition and use of personal computer and related products.*

The venture would have only had a limited chance of success before the PS/2 announcement

■ ***Data Sat's Robert Singleton***

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What did IBM buy for $22 billion?

Michael Sullivan-Trainor looks at an investment in robots, mobots and worldwide factories

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The process is controlled by IBM Series/1 computers — local controllers at the machine level and a large, fully configured "module master" overseeing the entire board line. Unless something goes wrong, the line operates almost completely without human intervention, producing 50 different types of logic cards for personal computers, printers and typewriters.

Meanwhile, on the factory floor below, robots, inserters and wave-solder machines surround a surface-mount machine. Using the new surface-mount technology, which incorporates a proprietary IBM design, IBM creates double-sided boards for the Personal System/2 that increase circuit density by as much as 30 to 50 per cent of traditional pin-insertion boards. More circuits take up less space when installed this way in the PS/2, and signals travel more quickly between components.

■ ***Heinz Fridrich . . . driving investment***

During the past five years, IBM invested more than $US22 billion in its 39 plant's equipment and property — $US350 million to upgrade the Lexington facility alone. The investment is equivalent to 80 per cent of Digital Equipment Corp's total revenue for the same period.

But what did IBM buy for $US22 billion?

IBM invests so much money in manufacturing because it must meet a complex set of requirements to stay competitive in the market, according to Heinz Fridrich, IBM's director of manufacturing.

First, IBM's goal is to be the technology leader, producing innovative, proprietary products. The lion's share of the investment is devoted to developing its manufacturing techniques to meet product requirements.

A second goal of the company is to be the low-cost producer of products within each of the many markets it pursues. Five per cent to 10 per cent of the manufacturing investment is devoted to improving productivity through automation, Fridrich said.

Frequently, the first goal conflicts with the second because it requires spending more money, while the second goal focuses on saving money. Despite IBM's desire to be the low-cost producer, its manufacturing arm has little choice but to invest in expensive tools to build products.

"You need investments in new technologies so that you can do your development. That's what really drives investment," Fridrich said.

As a result, Fridrich's managers try to save money in other ways. A prime example is their philosophy of Continuous Flow Manufacturing (CFM), IBM's version of the Japanese Just-In-Time concept, which requires workers to maintain a continuous flow of products on the lines, greatly reducing work in process and inventory and, at the same time, speeding production.

IBM's manufacturing managers must also be able to respond quickly to product demand. During the past five years, these managers geared their plants to produce high volumes in order to meet market forecasts. Today, the forecasts have proven to be overly optimistic, and many plants are not utilised to their maximum capacity.

To deal with capacity problems, IBM practises work-load balancing, shifting products between plants. Such a strategy requires a great deal of flexibility. Investments in automation — particularly programmable robotics — make this balancing possible.

Another way IBM meets its manufacturing goals is to rely heavily on inhouse production. Cost, quality and proprietary technology are easier to control when the

(Continued page 32)

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(Continued from page 31)

participation of outside vendors is kept to a minimum.

To further support the capability of developing products in-house, IBM uses a portion of its manufacturing resources to educate managers in new processes that give IBM a market edge.

"We teach things that are not generally known — techniques for measurement, surface preparation, a whole range of process capabilities," said Sam Korin, director of IBM's Manufacturing Technical Education Centre.

The crown jewels of the IBM manufacturing empire rest in the heart of New York's Hudson River Valley, where seven plants make everything from semiconductors to printers. A short distance from the Armonk corporate headquarters and the Thornwood education centre, three of IBM's most sophisticated facilities employ some 30,000 people to build the company's highend machines — 3090s, 3080s and 4381s.

From its birth at chip level in East Fishkill NY, to its assembly and testing in Poughkeepsie and Kingston, NY, the main components of the 3090 system travel less than 30 miles between plants before they reach the customer.

To assemble these components, other parts are required from IBM plants in New York, Vermont, Texas, Arizona, California, North Carolina, France, West Germany, and Japan.

Advanced manufacturing processes are the hallmark of the 3090's development. Because complex, proprietary processes are required and because of IBM's desire to ensure top quality and reliability, great pains are taken to develop most of the components within the corporation.

> *'We educate managers in new processes that give IBM a market edge'*

Silicon crystals

This emphasis on quality extends to most basic level — silicon crystals produced in East Fishkill. Crystal ingots are painstakingly pulled from molten silicon. The ingots are smoothed into cylinders and then sliced to form wafers. Logic and memory chips are eventually diced from the wafers.

To accelerate chip production, IBM uses "master-slice technology," which requires a predefined circuit pattern to be repeated on silicon wafers. Many arrays of identical circuit-element cells are produced as a result, allowing designers to add new circuitry to modify chips.

In addition to the chips, the East Fishkill plant manufactures substrates — chip carriers that are the core of the 3090's thermal conduction modules.

To accomplish these processes, IBM redesigned the plant, completing a 14,000 sq m test facility in 1984 and a new semiconductor building in 1985. Among the more elaborate measures in the plant design are actions taken to control contamination and dust. Class 100 air is pumped continuously through the chip-fabrication rooms. To prevent vibration, manufacturing is restricted to the middle floor of the plant, which is supported independently of the top and bottom floors. Those floors house the airflow equipment.

Both the increased cost of equipment and the complexity of the technology make semiconductor manufacturing one of the most expensive processes at IBM. "Thirty years ago when we built 1000 wafers, it cost $US3 million to $US4 million," Fridrich says. "Now, for 1000 wafers, the tooling alone is probably a couple of hundred million. We have increased from decade to decade by almost an order of magnitude."

New circuits are produced by the East Fishkill factory in 18 days, compared with at least six weeks' production time required by other semiconductor manufacturers. After they leave East Fishkill, the chips and substrates are sent to Poughkeepsie where they are housed in thermal conduction modules (TCM). The modules are mounted on raw TCM boards constructed in Endicott. First introduced as part of IBM's 3081, the TCMs are used to cool the mainframe's logic and array circuits.

A data system based on two 3090 hosts and several Series/1s controls the assembly and test of Poughkeepsie's entire TCM operation. When an order is received from sales, the data system checks the inventory, both on the production lines and in the warehouse. To meet the order's requirements, the system will automatically place an order with other IBM plants and outside suppliers, which send the needed materials along with numerical control data describing the history of each part.

Data about defects in each chip substrate and board is made into a composite with data from engineering laboratories regarding change orders for the modules. The data is communicated from the host to Series/1 systems, which run the tools that assemble and test the modules.

A floor control system, also run by the host data system, manages the flow of products through the lines by maintaining a sort of inventory book that shows where all the parts are and what stations are available.

On the bottom floor of Building 004 at the sprawing Poughkeepsie site, the data system begins assembly of the TCMs. Chip sets from East Fishkill are place in bins according to order numbers. An operator activates an automatic "picker" that selects chips from the inventory bins to create a specified strip of chips to build a particular module.

The substrates are mapped using a tool specially designed for the purpose. The mapper controls the placement of engineering change orders and sets the unique features of the chip sites. As the modules go through subsequent operation, the Series/1s on the line refer back to the data recorded by the mapper to determine the correct location of the chips for each module.

Following mapping, a Series/1-guided laser modifies the substrate chip pads by

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well with theirs?

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Unfortunately this is not so with many other vendors.

"IBM compatible" has become a smoke screen behind which unscrupulous salesmen can hide a multitude of shortcomings. (After all every car is "compatible" with the left hand side of the road, but that is not to say that all cars are equally good.)

If you're not careful you'll be trying to marry two characters who are not really suited.

Soon you'll have a divorce on your hands and like most divorces it will be messy, lengthy and above all costly.

But why not just buy IBM and be done with it?

For a start Data General can be even more compatible with IBM than they are themselves. Could be you'll find software solutions running on our computers that they have not worked out themselves yet!

Then there are all the outstanding characteristics of our individual computers. For example, only Data General has true Business Automation, a system which combines secretarial, administration and decision support functions all on one terminal (more on this later).

And only Data General has the Data General/One, the world's first full function portable business system.

The fact is that for many applications Data General has created better systems, as over half of Australia's top 100 companies have discovered.

So not only do you get the best computer for the job but also the secure knowledge that it will be able to speak fluently to any IBMs it happens to meet during its life.

This brings us to a second form of compatibility no less important than the first.

Every computer within a vendor's product range must be able to integrate with every other computer in the range.

Otherwise you end up with a very expensive square peg that

deleting connections to accommodate defects and engineering changes. The chips are aligned and placed on the substrates by a tool that works from a computerised image of the chips and integrates that with an image of the substrate suface. The machine stops at every 10th chip to allow an operator sitting at a terminal to check its work.

After the chips are placed, they are bonded to the substrate with solder in a reflow furnace that makes all the connections — more than 100 per 3090 module — simultaneously.

Wire bonding between the chip pads is done ultrasonically with copper wire using a discrete auto bonder (Dab), which resembles a sewing machine when it operates. During the process, the high-frequency ultrasonic vibration buries the gold plate of the chip pad. The Dab obtains the bonding co-ordinates from a Series/1. Operators are stationed at the machines to watch for defects in the process.

Unpredictable changes in temperature can affect the reliability of the chip connections. The major test in the process is performed by the Pougkeepsie Accelerated Run-in System, or Paris, which subjects the modules to varying power and temperature cycles to drive the chips to fail in the equivalent of six hours of operation. Any failures are sent to the East Fishkill plant by the host and the reason for the problem is investigated.

While the entire operation is computer controlled, there are certain key areas in which IBM found there are things people can do better than automated devices. At the beginning of the production line, a robot stands idle in the centre of a room filled with manned workstations. There, operators insert 20,000 C-springs — in strips of 1000 — into each TCM board. The springs connect the TCM modules to the boards.

■ ***Solder connections on PC planar boards are made in the wave solder aqueous cleaner at IBM's Australian plant at Wangaratta, Victoria.***

"We did attempt a robotic program on this, but we could not imitate the operator' hand-eye co-ordination," the manager of the TCM board line said.

When IBM first considered automating the line, it took an operator eight hours to complete the insertions. Now, because of efficiencies that reduced the amount of work in process, the operator takes less than four hours to finish the job.

After the C-spring insertion, the boards go through a wavesolder machine that fills the C-spring holes with flux. The boards are then X-rayed and inspected by operators to make sure all the holes are filled.

Before the installation of an automated board line in Poughkeepsie in 1985, the 3090 boards were built in separate areas, or "pockets of production," and operators wheeled them around on carts. Manual board handling required extra operators to be available — idle — to help move boards from station to station, because the boards exceed the weight limits set by safety standards for a single person to lift. It also resulted in a great deal of work in process — extra inventory from a manufacturer's point of view.

Defects reduced

Now the boards travel on a track in self-propelled cars. Each board is stamped with a barcode, and barcode readers are stationed at spurs along the roller-bearing track so computers at various locations can determine which board is being sent to which station. The data collected by the barcode readers is communicated to the central data system.

In the final board assembly, robots instal capacitors and bond them by using a hot gas tool to liquify the solder. The robotic system, controlled by IBM's industrial personal computers, has reduced the defect categories from 12 to two.

A Puma robot armed with a force-controlled sensor, is used to instal terminating resistors on the boards. Operating with a self-correcting program, the robot will change locations up to five times to find the right force for seating the resistors.

After it leaves Poughkeepsie, a 3090 TCM board is placed in its frame and married with other components at the Kingston plant. Because of the technology requirements of the 3090, IBM relies heavily on its inhouse expertise. There are times, however, when outside vendors are called in to help.

In addition to farming out work to vendors, IBM balances work loads within the corporation. Because the company main-

(Continued page 35)

puter get on this

will not fit into an equally expensive round hole.

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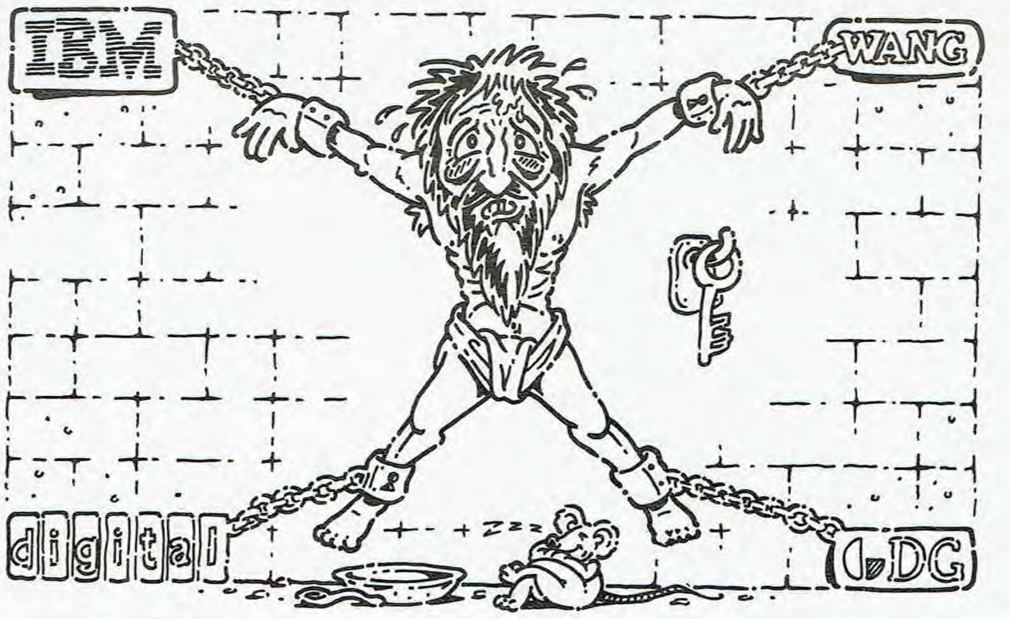

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		RS232 SERIAL	CENTRONICS PARELLEL	DATA PRODUCTS PARALLEL	IBM S/3X	IBM 3270	IBM CHANNEL	WANG VS/OIS	DEC	DG	PRIME	HP	FACOM	DATAPOINT	QANTEL	BURROUGHS	NCR
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1025	200/50 CPS	■	■					■	■	■	■	■		■	■	■	■
3310	300/75 CPS	■	■					■	■	■	■	■		■	■		
3410	400/100 CPS	■	■					■	■	■	■	■		■	■		
3500	400/100 CPS	■	■		■	■											
4410	400 LPM	■	■	■				■	■	■	■	■		■	■		
4440	800 LPM	■	■	■				■	■	■	■	■		■	■		
4500	400/800 LPM				■	■							■				
PP 8	8 PPM	■	■		■	■				■	■	■		■	■		
LZR 1230	12 PPM	■	■		■	■		■		■	■				■	■	
LZR 2600	26 PPM	■	■	■	■	■		■	■	■	■				■	■	
PS 351	200/50 CPS	■	■						■	■	■			■	■	■	
PS 353 TX	200/50 CPS		■		■												
PS 359	400/95 CPS	■	■		■	■			■	■	■			■	■	■	
LW 455	400 LPM	■	■	■	■	■		■	■	■	■	■	■	■	■	■	■
LW 855	800 LPM	■	■	■	■	■		■	■	■	■	■	■	■	■	■	■
LW 1255	1200 LPM	■	■	■	■			■	■	■	■	■	■	■	■	■	■
B 600	600 LPM	■	■	■				■	■	■	■	■		■	■		
BP/1500/2000	1500/2000 LPM		■	■	■		■	■	■	■	■	■	■				
EM II/III	1440/1600 LPM		■	■				■	■	■	■						

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(Continued from page 33)

What did IBM buy for $22 billion?

tains a full-employment policy. IBM will often move work from one plant to another plant that is experiencing low demand rather than lay off idle employees. IBM is continuing to balance work loads as well as take more drastic measures because many of the plants are underutilised.

While IBM does not agree that over-automating is the cause of its troubles, the corporation is reducing expenses because of decreased demand. It also took the extreme measure of closing a plant in Greencastle, Indiana.

Located in the heart of bluegrass country, IBM's Lexington facility is surrounded by pastures dotted with grazing Kentucky Derby hopefuls. The location seems an unlikely place to make a stand against the Japanese. In fact, rather than view its efforts as copying the Japanese, IBM regards the plant as the culmination of many homegrown concepts prevalent throughout the corporation.

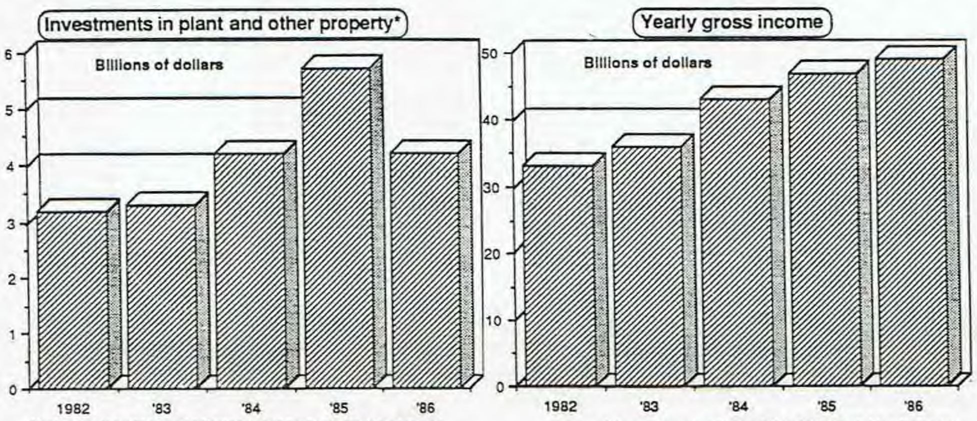
Early concept

Robotics and automated assembly lines have also been implemented wherever possible.

Early Manufacturing Involvement (EMI), which brings manufacturing engineers into the product design process, is an early 1980s IBM concept that the Lexington facility put to work, reducing the number of parts required to build its products. EMI also led to designs for printers, typewriters and keyboards that have common subassemblies that are better suited for the manufacturing process.

Another progeny of Lexington's EMI project is a "flexible pallet". Any product that fits on the pallet can be made on the plant's assembly lines. Product designers stay within these limitations when creating new models.

The only truly Japanese approach used in the Lexington manufacturing process is Continuous Flow Manufacturing. Since the task force developed the CFM concept in the early 1980s, all of IBM's plants have adopted it to a certain extent.



*Category includes expenditures for nonmanufacturing property

Information provided by IBM CW Chart: Lisa Romano

IBM has spent about 10 per cent of total revenue in the past five years on land, buildings, machinery and equipment. The majority of the $US22 billion has gone on manufacturing improvements.

CFM focuses on cutting manufacturing costs by reducing the parts inventory to only the amount needed for current production. This strategy, in turn, cuts down on work in process and requires suppliers to deliver directly to the production line. Japanese-style Kanban queues are used throughout the process to control the number of parts that build up at different stages.

If the parts exceed the maximum Kanban limit — set by the engineers who designed the line — that is a signal to the operator and manager that a problem must be resolved on the line. The difficulty with CFM is that it represents a cultural change for IBM.

As with Just-In-Time, CFM takes time to implement, and IBM is still in the midst of a public relations campaign within certain plants to push the concept.

In addition to automation, EMI and CFM, Lexington's production is driven by a desire to build most parts and products inhouse. When typewriters and printers began requiring more plastic parts than metal ones, Lexington switched its inhouse expertise from machining tools to injection molding.

Unlike smaller companies, which have less pull with their suppliers, IBM can influence the practices of its outside vendors because of the volume of parts it requires.

The prejudice toward inhouse product construction does not carry over to manufacturing processes. Here, the Lexington plant's approach is to use what works — whether it is IBM's or someone else's part.

In addition to not wanting to duplicate others' work, Lexington uses outside vendors for its manufacturing processes because there often is not time to develop a process inhouse. The willingness to use other vendors' manufacturing equipment does not prevent IBM engineers from experimenting with automation, however. Such experimentation led to breakthrough such as the first tactile sensing robot.

Although they perform assembly tasks in many of IBM's plants, the robots also perform less complex tasks than parts differentiating. At one point, they were used by Lexington plant engineers to stamp barcode labels on products.

Other plants are more difficult to automate than Lexington because of dissimilar product lines and product change due to workload balancing.

Located about 150km from Minneapolis, the 7000 employees at IBM's Rochester plant use a mixture of automated and manual processes to produce the System/36 and /38 processors, the System/36 Personal Computer and direct-access storage devices (Dasd) ranging in capacity from 20M- to 400M-bytes.

Pilot lines at Rochester build circuit boards used in the intermediate systems. Disks and disk heads are assembled and also put into the mid-range products.

(Continued page 37)

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(Continued from page 35)

Claimed as the largest IBM facility under one contiguous roof, the 300,000 sq m plant is equivalent in size to 76 football fields. While there are larger sites within IBM, Rochester holds its title by maintaining covered walkways that connect most of its 31 buildings.

The walkways are vital to the vertical integration of the plant and the implementation of CFM. Automatic guided vehicles called "Raymonds" roam the corridors, taking parts to assembly lines and finished goods to transfer locations.

While production volumes for each product are based on market forecasts, which fluctuate monthly, the subassemblies of certain products are built according to a "pull logic system." An integral part of CFM, the pull system allows one department to pull the parts to build its products from another department as needed. This system reduces work in process and inventory, because the supplying departments await actual requests from the pulling departments instead of building up inventory based on estimates. The system also includes buffers with Kanban limits that prevent too many or too few parts being built at any one stage of the process.

Automation also came to the Rochester plant in many forms, the bulk of it going toward product testing. A pair of mobots (mobile robots), affectionately named "Sven" and "Olie", work inside a floor-to-ceiling clean tunnel attached to a clean room where 200M- and 400M-byte Model 9332 hard disks are made for the System/36 and 38. The mobots act as handlers, gliding on wheels and placing assembled disk packs in testers.

Where will the combination of investments in manufacturing technology, fluctuating markets and new concepts lead? Perhaps the answer lies in what IBM chose to do with its latest product — the PS/2.

Once the site of Series/1 manufacturing, the Boca Raton plant is now the centre of PS/2 activity. Like Poughkeepsie, Boca Raton is the assembly point for parts from other plants.

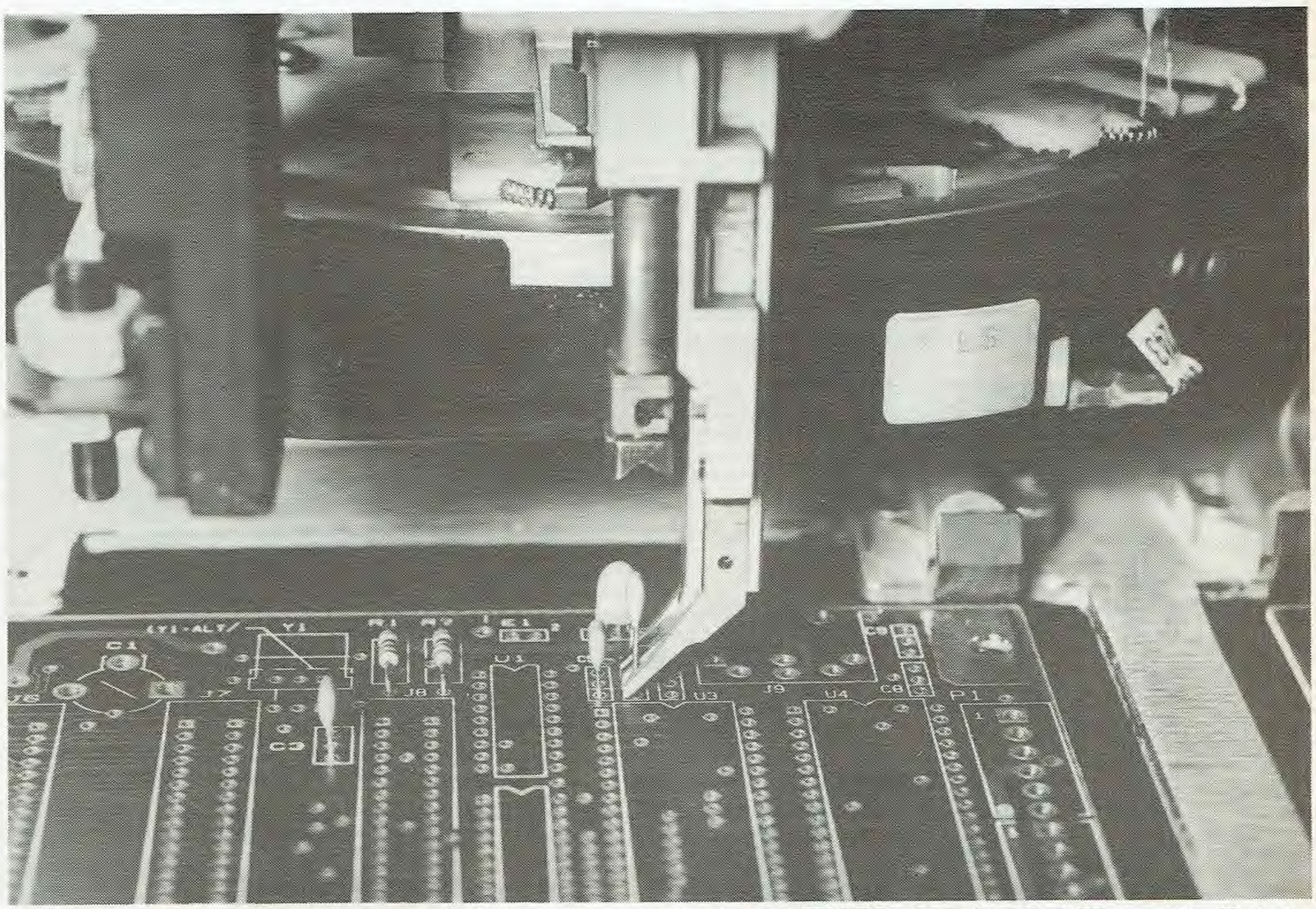
To eliminate setup time for different products, all eight PS/2 models are built on common lines using a flexible pallet designed along the lines of the Lexington one.

They are made with fewer screws than their PC predecessors, thanks to EMI in product design.

Conveyors move parts from one step to the next, and barcode readers allow the plant's host data system to track the

(Continued page 38)

What did IBM buy for $22 billion?



■ *A radical sequencer-inserter automatically inserts a capacitor into an IBM PC planar board at Wangaratta, Victoria*

Japanese philosophy

KANBAN is the Japanese word for manufacturing philosophy of providing a smooth production flow that allows for continual improvements in process.

Key to this Japanese philosophy is reducing work in process (Wip), as well as reducing lead times, inventory and setup times. IBM incorporates Kanban in its Continuous Flow Manufacturing concept.

The two ideas merge on the factory floor in many IBM plants where Kanban signs stand over workstations. Numbers are posted below the Kanban sign to represent the minimum and maximum Wip allowed at a workstation to maintain continuous flow down the line.

In this manage-by-sight system, the operator can judge the pace of activity on the line by comparing the Wip at the stations with the Kanban limits.

■ *Two instructors at IBM's Manufacturing Technical Education Centre experiment with a robotic arm*

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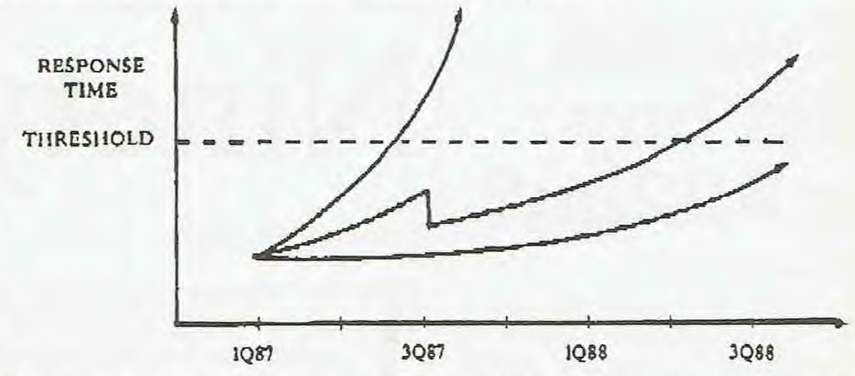

If you want to introduce or upgrade these skills in your organisation, Boole & Babbage can help. As one of the world's leaders in the fields of computer performance and capacity management, we are offering two courses on the subject:

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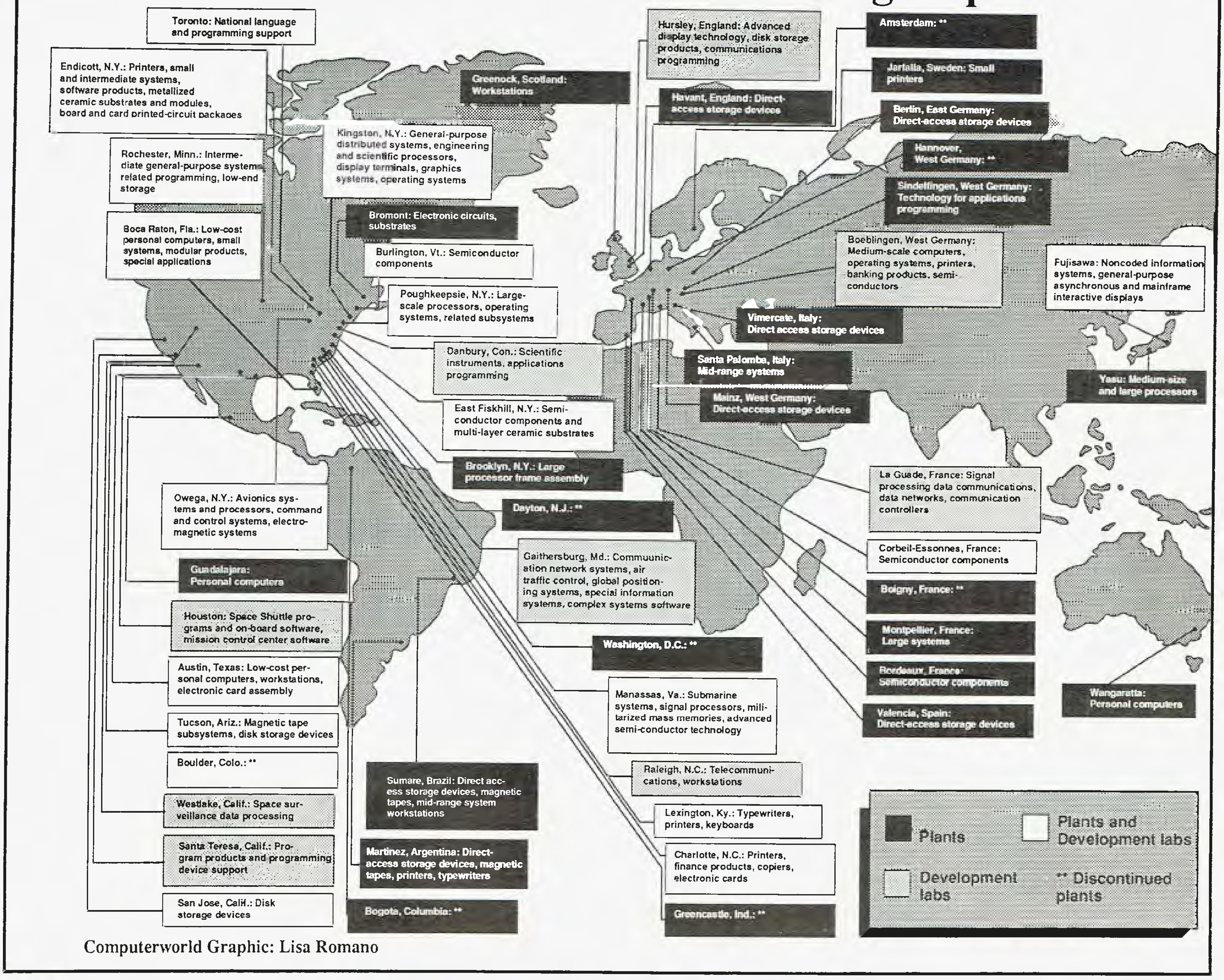
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Wangaratta: Personal computers
Plants
Plants and Development labs
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Computerworld Graphic: Lisa Romano

What did IBM buy for $22bn?

(Continued from page 37)

location of all components. The data is used to prevent defective components from going farther down the line, and it is stored for the day when it may be needed to trace the cause of a problem at a customer site.

Of all the aspects of IBM's investment in manufacturing in Boca Raton and elsewhere, the least expensive — CFM — is the most significant, said the director of IBM's Thornwood education centre.

"We went through the 1960s with value engineering," he says. "Then there was the high-volume/low-cost concept. We have introduced group technology and automation. EMI has done us a lot of good. But CFM has had the greatest impact because it requires cultural change."

What is next? "More of the same. We will be preparing our people for assembly of products atom by atom, molecule by molecule. We are already talking in terms of molecular thicknesses."

- *Michael Sullivan-Trainor writes for US* Computerworld

Ninety MCs signed

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THE challenge for every computer supplier today is to ensure the availability of quality equipment and software backed by indepth support which is specific to the industry. IBM feels that the most efficient method of doing this is through its Marketing Contractor (MC) program.

After running the program for only four months, IBM has signed 90 companies in 110 places to become MCs, selling midrange IBM systems and specialised software packages.

The companies, which include software and systems houses and systems integrators, are based all over Australia and in Papua New Guinea.

Hardware products in the Marketing Contractor program include the System/36, System/38, 9370, PC RT and the 4300 range of computers. Software products marketed by the MCs cover a wide range of applications.

They include manufacturing and distribution, banking and finance, health, process control, government and administration, education, hospitality, real estate, legal, business modelling, motor vehicle sales, aircraft maintenance and many other commercial and industrial applications.

IBM anticipates that the number of companies taking part will continue to grow strongly. The MC Program was established by IBM Australia in February this year and replaces both the Value Added Marketing and Complementary Marketing Associates schemes.

John Richards, IBM Australia's Operations Manager, General Region, said: "The new program has been exceptionally well received by the companies taking part and their customers.

"Many companies which were neither Value Added Marketers nor Complementary Marketing Associates have become MCs and we are now processing over a dozen applications from companies that sell other manufacturers' equipment.

"That in itself is significant because it requires a large investment and commitment to change hardware suppliers. We decided to replace the two previous schemes with one Marketing Contractor program because it is much simpler for all concerned."

Richards said that IBM expects the MCs to be involved in 75 per cent of IBM's midrange sales. He added that all the companies that have joined the new program offer specialised products and services and have expertise in segments of the marketplace which will enable them to add value to IBM products.

Before becoming part of the program a company must prove that it has a sound track record in the information processing industry, technical expertise in a value added applications area, well established demonstration and support facilities, management experience, and proven marketing skills. In some areas the companies also offer hot-line support. IBM supplies and instals hardware sold by MCs and provides customer service.

In line with previous practice, IBM will carry out a survey each year of MC customers to determine how satisfied they are with support, hardware and software performance. "Surveys conducted in Value Added Marketing and Complementary Marketing Associates' installations showed that customers were highly satisfied with the product offerings and the level of support," said Richards.

Keys of kingdom safe

There's a chink in the armor, but the heart is still protected, writes Noel Bennett

IBM was shaken. A senior executive heatedly threatened that he would accompany every salesman on his call whenever an IBM account was considering this alternative new product. That was many years ago, but the executive could have been prescient, foreseeing that the principle behind this product could be applied to the heart of IBM's business — its mainframes.

The anger was over an IBM account, the Atomic Energy Commission installing disk drives from Ampex. From this chink, the door swung wide open to the entry of plug-compatible mainframes, and "plug-compatible" everything, down to personal computers. This has left IBM competing not only up front with those traditional suppliers who have adhered to their own architectures and protocols, but also with those marching behind, the PCMs.

The PCM disk drive suppliers can be divided into two classes — those who concentrate on supplying the product itself, for example, Storage Technology and Memorex, and those for whom the devices are ancillary to their main business thrust, the supply of PCM mainframes, such as National Advanced Systems and Amdahl. Fujitsu does not fall into this category because while it began as a PCM, it is determinedly pursuing its own machine architecture and networking protocols. Interestingly, Storage Technology and Memorex almost fell over when they moved into what appeared to be the greener pastures of supplying mainframes. The green rapidly turned into desert — covered with blood from a leaking balance sheet.

Toehold

Development costs and the marketing and support requirements of getting a toehold in a market dominated by IBM and then growing from that base were a different ball game from that played in the disk drive arena. The market perceived that for the PCM mainframe suppliers, the supply of drives to IBM accounts would establish a rapport between the two parties and so allow easier penetration with the main product — the CPU.

No doubt this did happen, but the CPU PCM suppliers long ago established themselves as being reputable and viable suppliers. So they market their CPUs head-on, offering equipment that the market finds increasing agreeable with its price and feature differentials from IBM equipment.

To counter this threat to the fast, but controlled rhythm of its corporate heartbeat — the mainframe — emanating from the PCM CPU suppliers and that worrisome "upstart," Digital Equipment Corp, IBM has been forced to drop prices itself.

IBM recognises that once it has lost the computer room to other suppliers, then it stands to lose the "add-on" business coming from terminal and other equipment tied into that mainframe.

However, it is not only the host and disk drive manufacturers which IBM has to fend off, because suppliers of alternative equipment have also moved into other areas such as printers and front-ends.

Accordingly, compared with the first arrival of the PCM disk drive manufacturers, the competitive picture is now far more complex for IBM. As soon as one dragon is slain, two spring up in its place. Not that the dragons themselves have gone unscathed — Control Data Corp, for example.

Disk drives are a miracle of the coming together of many disciplines: mechanical, electromagnetic, hydraulic, chemical and aero-dynamics among others.

The reliability and capacity of disk drives, as with other computer equipment, has improved and increased markedly. However, they are still an anomaly when compared with the solid-state master host to which they are servants — the movement of the disk compared with the silent flow of electrons.

Conceptually it would be more appropriate if auxiliary storage did not exist, except perhaps for archival purposes or other non-immediate purposes, but was integrated within the host itself in solid state, obliterating the distinction between main and auxiliary storage.

This will depend on major strides in solid-state technology, but that it could be possible is indicated by developments at the personal computer level.

If solid-state "auxiliary" storage did eventuate, then more and more pre-eminence in hardware would accrue to the company or nation with this expertise.

IBM itself is not lagging in solid-state research and development, but as the recent semiconductor "trade wars" would indicate, Japan Inc has become a formidable competitor with the US in particular fields of this technology, and its drive towards

(Continued page 40)

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Citibank goes for Storagetek

THIRD-party disk drives are playing a key role in enhancing the computerised investment banking services of Citibank throughout Australia, according to the bank's executive manager, data centre services, Ian Anderson. Citibank offers its Australian clients instant access to a wide range of investment banking services anywhere in its global network.

Via their own personal computers, customers dial in foreign exchange, money market, funds transfer, bills of exchange and other transactions direct to Citibank.

To provide this service in the competitive world of wholesale banking, Citibank's data centre in Sydney contains two IBM 4381 CPUs, which run under an IBM Dos environment. Citibank plans to migrate to IBM MVS/XA in the near future. It uses Storagetek disk drives.

However, Ian Anderson said that with growth in business and an increasing volume of client transactions, the ability to access data was being inhibited.

"While our CPUs had sufficient capacity to deliver the level of service required, the channels from the CPUs to Dasd were excessively busy, with loads well above industry standards. Channel speeds were limited to 1.8M-byte and our customers were being inconvenienced during peak loads by variable response times for our online service.

"Evening batch processing loads also meant that, in the event of system failure, we had virtually no recovery time before recommencement of the online daily service at 8am.

"For these and other reasons, we needed to find a high performance, cost-effective solution that would enable us to maximise customer service and reduce batch processing time."

Following investigations into alternative suppliers and discussions with its Hong Kong office, which was also considering installation of Storagetek products, Citibank awarded the company a $A1 million contract to supply and instal two ST8890 cache controllers, one ST8880 disk controller, three ST8380 AA4 disk drives and three ST8380 BD4 disk drives.

"The primary reason for selecting Storagetek was price competitiveness," Anderson said. "If you are to remain competitive in the aggressive financial services sector, expenses need to be controlled. Citibank worldwide is downsizing its operations by trimming unnecessary expenditure and seeking more cost-effective solutions to its requirements.

"However, there were other important reasons for selecting Storagtek. The company's ST8890 cache controller is the only industry product of its kind that can operate in a Dos environment. All products required were readily available, they had a high reliability factor and could be serviced locally by experienced personnel. Storagetek was also able to deliver a highly competitive financing package and demonstrated that it would be able to provide technical and service support over an extended period."

Anderson said installation proceeded smoothly and with minimum downtime because of planning and top level support provided by the supplier's technical engineers.

"This support has also continued well beyond the commissioning phase. By providing regular performance appraisal and storage utilisation reports, the vendor is helping us to achieve maximum computer operating performance and plan our future capacity requirements."

Anderson said: "Response times for our online service are now consistent, quite independent of peak load demands. The facilities have allowed us to increase channel speeds from 1.8M-byte to full 3M-byte capacity.

"At the same time, the ST8890 cache controllers have reduced batch processing time by 90 minutes each day. This has created a valuable time buffer which enables us to rectify any system faults without intruding into our daily online investment banking service," he said.

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Keys of the kingdom

(Continued from page 39)

world supremacy is unabating.

The corporation is becoming more open, recognising that it has to live in a world where buyers are now firmly demanding standards so they can more easily mix and match the equipment from different suppliers to meet their requirements.

But there must be limit to this tolerance, as indicated by the PS/2, and also by the multiplicity of products which IBM has released to enable its own disparate products to be connected to make a cohesive whole. This indicates that it recognises it must also be a passenger on the standards, connectivity bandwagon.

Perversely, IBM could be thankful for the arrival of PCMs, for they have helped to make the world of computers an IBM world.

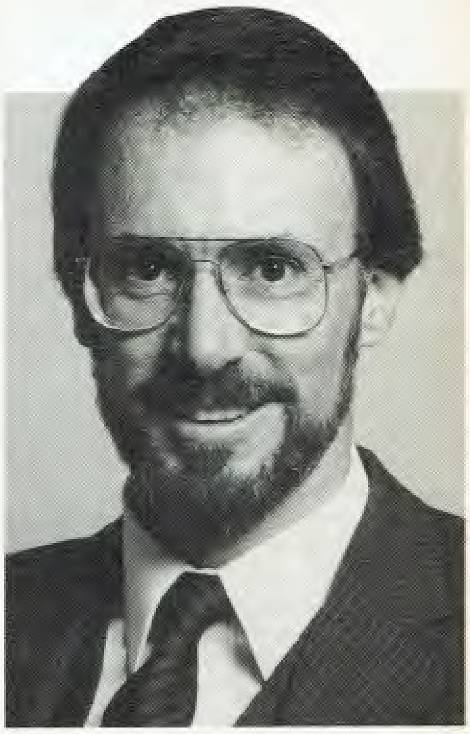
So while sharing the cake with others, the slice of the cake which it is receiving may be larger than an IBM Corp-only cake, particularly when governments are increasingly against "dominance" of market sectors.

Perhaps that executive who became so excited about the arrival of the first PCM disk drive might now, on reflection, have second thoughts.

After all, the corporation does hold the keys of the computing kingdom — the operating systems.

Name of the game

Steve Ireland looks at the role of the departmental processor



■ *Dennis Bowler . . . open architecture*

THEY say that a "rose by any other name" affects the nose just the same, but Dennis Bowler can tell you that, in marketing, that just is not so. "When we launched our new 9936 system in the States, we called it an application processor, said Bowler. "Unfortunately we found that name conveyed nothing to people. To position the product properly, we decided to alter the name to Departmental Processor."

Bowler is international marketing director of Courier Information Systems, part of the Alcatel NV, the second largest telecommunications company in the world.

Courier makes terminals, controllers and printers serving the IBM 3270 marketplace: its products are sold in Australia by STC, which is also part of Alcatel these days. Today, however, Courier is broadening its scope, moving into local area network offerings — and into "departmental application processors".

The 9936 Departmental Processor is the departmental cornerstone of Courier's (and thus STC's) office automation effort, according to Bowler. The 80286-, Xenix-based system gives up to 32 users the ability to access local processing and data storage functions, independently of the mainframe.

"As we expand into the office environment, no one vendor can 'own' it all, therefore an open architecture is needed," Bowler said. "For example, DEC is the de facto standard in engineering; Wang in multi-user word processing. The marketplace is a jigsaw. Our particular target is large corporate departments.

> ‘
>
> ***As we expand into the office environment no one vendor can own it all***
>
> ’

"The 9936 is a Xenix-based, multibus machine," Bowler said. "It is an open architecture machine, which lets companies do their own thing. The imagination of the user turns out to be the important thing."

For example, Bowler said the Dow Chemical Employees Credit Union in the US used a service bureau host. And that worked well. However the Union decided it wanted to own more of its destiny, while also addressing the need of totally avoiding downtime problems. Yet it did not want the expense of its mainframe and DP department.

Hence, Bowler related, the credit union put in a departmental processor. This is used to process loan and new account applications, while off-site transactions are still processed by the service bureau host. If the host goes down, the 9930 takes over teller transactions and stores the results on disk for transmission to the mainframe when it becomes available again. The Union also has more control over response times, and therefore over its own destiny.

Another reason for going to departmental processors, said Bowler, is to avoid the infamous PC proliferation problem ("PCs are difficult to support, and it is hard to control the data,") while at the same time providing productivity tools at the desktop.

Bowler believes the combination of the departmental processor with an organisation's existing 3270-type terminals is a good answer for many companies: "People have millions of 3270 terminals out there, they do not want to waste that investment," he said. "Departmental processing also lets the company control access to the host. And a 3270 by itself cannot corrupt host files, unlike PCs."

Courier is about to release an 80386 version of the 9936 departmental processor. It is also currently migrating from Xenix to Unix V release 3 (an interim version of the AT&T/Microsoft effort due late 1988), and should have this by year end.

Running in native 80386 mode "can put MS-Dos under Unix," and will thus open many more applications. Bowler predicts: "The Unix (version 3) 386 software market should just explode."

Meanwhile, Courier is still churning out the terminals. The company ranks second

(Continued page 42)

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Creative boost for Insure/90

IBM marketing contractor, Creative Computer Systems has achieved international recognition for its latest offering, Insure/90. The integrated general insurance package, which runs on the IBM System/38, is being installed in three countries, by Ansvar in London, Schweiz Insurance in Sydney and Commercial Union in Auckland.

Melbourne-based Creative offers two integrated general insurance systems which operate on both the IBM System/36 and System/38. Insure/36 has been developed for companies with smaller portfolios — between 1,000 and 80,000 policies, and Insure/90 will cater for companies with up to 500,000 policies and more.

According to director Adrian Brooks, Insure/90 is the result of a $A3 million R&D program and the culmination of his team's extensive experience in insurance software.

"Being an IBM marketing contractor gives us the security of an excellent well-supported product range. We are kept up to date with product developments and so we can have confidence in planning in our products and corporate direction," he said.

"Insurance software is a multi-billion dollar business worldwide and Australia has a definite lead in this area. "For this reason we opened a London office in March this year and we see Insure/90 as the key to our further success internationally."

Brooks said Creative's corporate goal was to be the most respected supplier of services to the insurance industry.

Schweiz Insurance general manager Siegfried Drews backs up Brook's statement, saying it is quite clear that Australian software companies have performed well in insurance system development. "When we looked at Australia we looked at Creative and they were clearly ahead of their competitors," he said.

"Creative already has plans to put technology into place to allow us to improve communication and transfer knowledge much faster than we were able to in the past, which will improve our competitive situation in Australia."

Commercial Union services a customer base with accounts ranging from domestic and medium range through to large commercial accounts.

According to Ernest Bennett, general manager services, Creative has been instrumental in the development of his company's computer systems in the Asia Pacific region.

"We looked at a number of systems and Creative was the one for us. We are well represented throughout South-East Asia and we believe it is better to have a uniform system and the ability to link it through our branches. Creative has this," he said.

While Creative is marketing Insure/90 internationally, it is also having success with Insure/36, the latest being a sale to Guild Insurance, replacing Guild's Hewlett-Packard system with two System/36s and about 70 IBM terminals. Under the terms of the deal, Creative will supply full onsite facilities management.

According to Guild Insurance general manager Warner Bastion: "Last October we decided to re-evaluate our computer needs and we concluded that we needed a company able to provide us with the works.

"Creative has provided us with a system that can be tailored for our needs, as well as all professional, technical and maintenance support at a fixed price."

Guild will instal IBM System/36s in its Melbourne and Sydney offices and the activities of its northern and southern regions will link directly into them.

The name of the game

(Continued from page 41)

to Telex in the US as a supplier of 3270-compatible terminals, said Bowler, while in Europe and Australia it claims the number one position (after IBM itself).

One direction is to allow people to get greater use out of dumb terminals ("dumb" means totally controlled by the mainframe).

"Our marketing shows that people out there are also saying they do not want to have more than one terminal — PC, dumb, Ascii — on their desktops. Some people can have two, three of four terminals on their desk.

"Our dumb terminals today already have multiple 'personalities' (though they are still 'dumb,') and people can tune them to different personalities according to what database they want to talk to."

Later this year, Courier will introduce an intelligent workstation with the glorious codename "High Noon": "The current 9230s can have Ascii and 3270 functions on the same screen," Bowler explained. "High Noon will allow access to the MS-Dos library as well, bringing Dos applications to the desktop."

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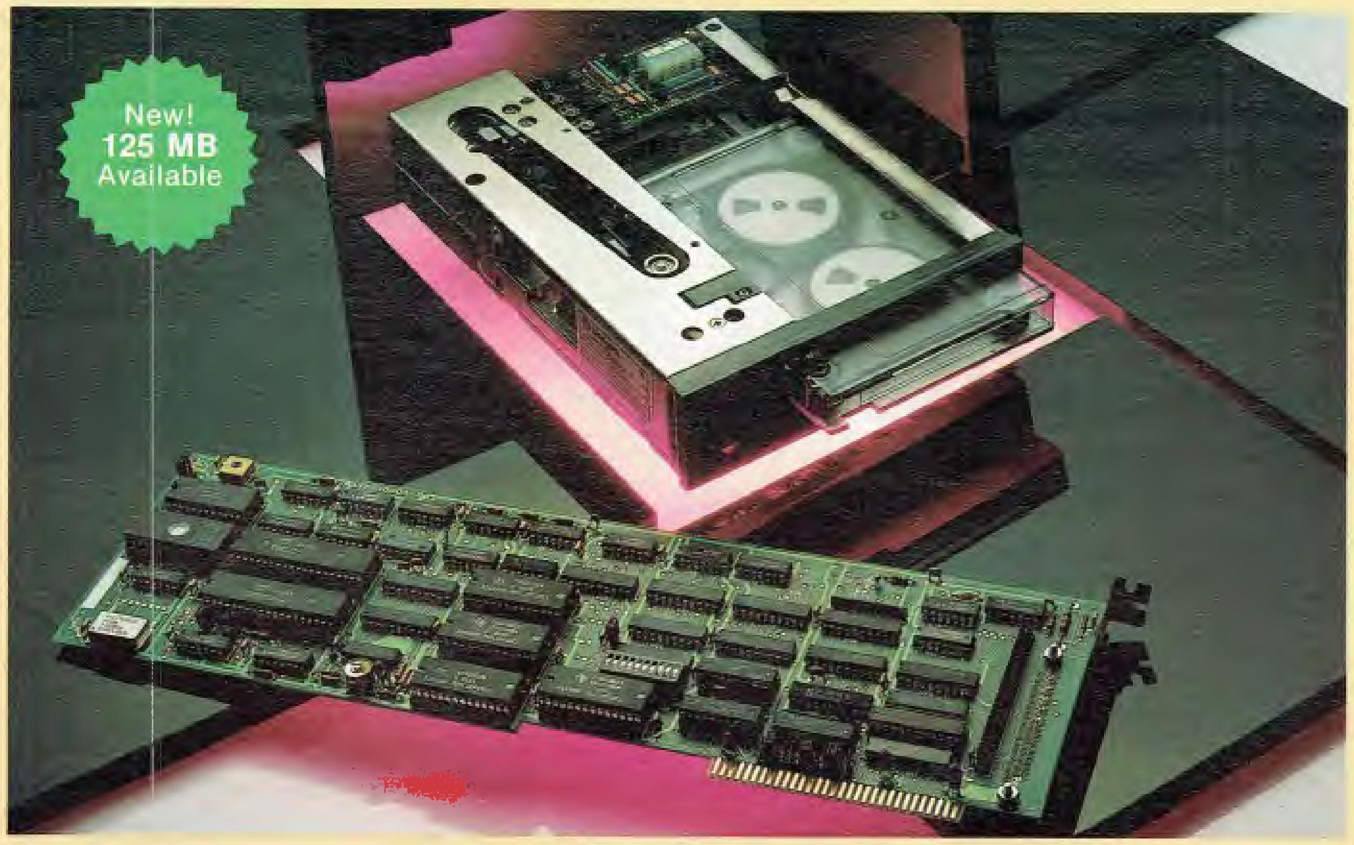

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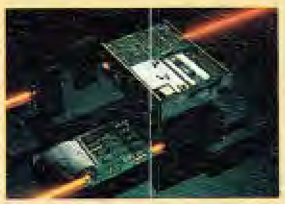
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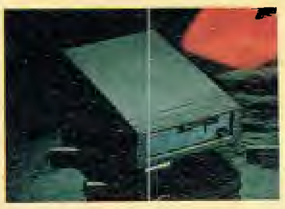
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SPOTLIGHT ON IBM COMPATIBLE TAPE DRIVES

compiled by
Gillian Sidebottom

								Backup speed												
Product Model/Manufacturer	Price ($A inc tax)	Cartridge/Reel-to-reel/Cassette	Internal/EXternal	Formatted storage capacity (M-bytes)	Form factor Full/Half-height	IBM-compatibility	Media	Streaming mode (M-bytes/min)	File by file mode (M-bytes/min)	Number of tracks	Data transfer rate (K-bytes/sec)	Recording density (bits per inch)	Recording code	Unattended backups	Password protection	CRC error detection	MTBF ('000 power on hours)	Documentation	Warranty
Alloy Computer Products (Australia) Pty Ltd — 5 Enterprise Court, Mulgrave, Vic 3170.																			**Tel: (03) 561 4988**
APT-40 Alloy Computer Products, Inc	$855	Cart	In	40Mb	Half	IBM PC, XT, AT & most compatibles	DC 2000	—	3Mb/min	20	250 to 500Kb	8333	MFM	✓	—	—	20	✓	✓
FT-60 Alloy Computer Products Inc	$1819	Cart	Ex	60Mb	—	IBM PC, XT, AT & most compatibles	DC 600A	—	1.8Mb/min	12	250Kb	6400	MFM	✓	—	—	18	✓	✓
APT-25 Alloy Computer Products Inc	$770	Cart	In	25Mb	Half	IBM PC, XT, AT & most compatibles	DC 2000	—	2Mb/min	12	250Kb	8333	MFM	✓	—	—	20	✓	✓
PC-9 Track Alloy Computer Products Inc	$13,105	R to R	Ex	42Mb	—	IBM PC, XT, AT & most compatibles	½" tape	0.7Mb/min	—	9	—	1600	Phase enc. ANSI & IBM comp.	—	—	—	5.5	✓	✓
Archive Computer Services Sydney Pty Ltd — 165 Walker St, North Sydney, NSW 2060.																			**Tel: (02) 923 1200**
Archive TB45/60	$2290	Cart	In/Ex	45/60Mb	Full (Ex) Half (In)	Full IBM compatibility	¼" tape	—	—	9	86.7Kb	8000	—	✓	—	—	—	✓	✓
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Excel Stream 60Mb Int/ Everex Systems Inc	$1899	Cart/Cass	In	60Mb	Half	PC XT, AT & clones, System 2/30, 50, 60	DC600A ¼" tape	5Mb/min	5Mb/min	9	90Kb	8000	GCR	✓	—	✓	10	✓	✓
Excel Stream 60Mb QIC 36 Ext/ Everex Systems Inc	$2399	Cart/Cass	Ex	60Mb	Half	PC XT, AT & clones, System 2/30, 50, 60	DC600A ¼" tape	5Mb/min	5Mb/min	9	90Kb	8000	GCR	✓	—	✓	10	✓	✓
Excel Stream 125Mb Int/ Everex Systems Inc	$2199	Cart/Cass	In	125Mb	Half	PC XT, AT & clones, System 2/30, 50, 60	DC600A ¼" tape	5Mb/min	5Mb/min	15	125Kb	8000	GCR	✓	—	✓	10	✓	✓
Excel Stream 125Mb Ext/ Everex Systems Inc	$3299	Cart/Cass	Ex	125Mb	Half	PC XT, AT & clones. System 2/30, 50, 60	DC600A ¼" tape	5Mb/min	5Mb/min	15	125Kb	—	GCR	✓	—	✓	10	✓	✓
Comperex — 16 Cambridge St, Epping, NSW 2121.																			**Tel: (02) 868 4700**
FS1000/Pertec Peripherals Corp	PoA	R to R	Rackmount or desktop	138 (unf) Mb	Full 8¾"	Full IBM/ANSI compatibility	6, 7, 8.5 and 10.5" reels	25/50/100 ips	25ips	9	40 to 160Kb	1600/3200	PE, DDPE	✓	—	✓	10	✓	✓
FS2000/Pertec Peripherals Corp	PoA	R to R	Rackmount or desktop	270 (unf)	Full 8¾"	Full IBM/ANSI compatibility	6, 7, 8.5 and 10.5" reels	50/100ips	50/100ips	9	Selectable	800/1600/3200/6250	NRZI, PE, DDPG, GCR	✓	—	✓	10	✓	✓
M891-II/Cipher Data Products Inc	PoA	R to R	Rackmount or desktop	92 (unf) Mb	Full 8¾"	Full IBM/ANSI compatibility	7, 8.5 and 10.5" reels	50/100 ips	—	9	72 to 384Kb	1600/3200	PE, DDPE	✓	—	✓	5.5	✓	✓

Key: ✓ = Feature available; — = Feature not available or information not supplied; PoA = price on application; Cart = cartridge; R to R = Reel-to-Reel; Cass = Cassette; In = Internal; Ex = External; REM = Removable; ips = inches per second.

The Product Spotlight on IBM-compatible tape-drives is based on a survey of tape-drive vendors and suppliers conducted between June 22 and August 14, 1987. All details should be checked with the respective companies as listed.

MAGNETIC tape is, of course, well-established as a data storage medium, with many early general purpose computers depending on tape for long term storage. However, with the rise of disk storage, tape tended to become restricted to use primarily for long term offline data storage. But the early market for tape drives, mainly characterised by large open reel devices suited to mainframe systems is a far cry from today's scene.

No longer is increased recording density the only measure of technological progress. The use of automatic loading tapes in the form of cartridges and cassettes and major advances in recording technigues have been major contributory factors in making tape storage a more attractive alternative for smaller personal computer-based systems as well as larger machines.

The proliferation of PC-based systems in business applications, notably those centring on IBM and IBM-based machines, has spawned a whole mini-industry to service the needs of this specific and ever-expanding user community. Correspondingly, as users place increasing demands on their systems, so maximum system performance becomes a major priority, and high reliability, higher storage capacity, economy and ease of integration are now among the main features sought.

A wealth of multi-feature tape drive products has evolved to meet these exacting standards of operation. Features offered are many and varied but include, for example: availability in internal or external configurations; full IBM and network compatibility; impressive data-handling capabilities and full vendor support.

Advancements in the nature and variety of the tape storage products available have also been reflected in the structure of the industry. When the computer industry was in its infancy, users had little choice but to purchase from PC vendors of plug-compatible systems. Now, however, it is a highly competitive sellers' environment characterised by a large number of major suppliers of high quality tape storage devices covering the full market from PCs to larger mini- and mainframe-based systems.

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* The development and deployment of expert systems in the financial services industry.

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AI'87 Secretariat, Stephen Moore, Karen Rickwood (02) 439 5133, Fax: (02) 449 5512, Telex: AA74752. Address: PO Box 929, Crows Nest, NSW 2065.

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Product Model/Manufacturer	Price ($A inc tax)	Cartridge/Reel-to-reel/Cassette	Internal/EXternal	Formatted storage capacity (M-bytes)	Form factor Full/Half-height	IBM-compatibility	Media	Backup speed		Number of tracks	Data transfer rate (K-bytes/sec)	Recording density (bits per inch)	Recording code	Unattended backups	Password protection	CRC error detection	MTBF ('000 power on hours)	Documentation	Warranty
								Streaming mode (M-bytes/min)	File by file mode (M-bytes/min)										
CVA Computer and Peripheral Sales Pty Ltd — Unit 2/18, Salisbury Rd, Asquith, NSW 2078. Tel: (02) 476 6400																			
5099-EK/Wangtek	PoA	Cart	In/Ex	60Mb	Half	✓	DC 600A	90ips	—	9	90Kb	10,000	GCR	—	—	—	8	✓	✓
5945-C/Archive	PoA	Cart	In/Ex	60Mb	Half	✓	DC 600A	90ips	—	9	86.7Kb	8000	GCR	—	—	—	—	✓	✓
TD440/Adic	PoA	Cart	In/Ex	40Mb	Half	✓	DC 2000	60ips	—	24	21Kb	12,500	—	—	—	QIC 100	10+	✓	✓
Elmeasco Instruments Pty Ltd — 15 McDonald St, Mortlake, NSW 2137. Tel: (02) 736 2888																			
Cipher 5210/Cipher Data Products Inc	$2520	Cart	Ex	25Mb	Full	PC XT, AT, System 2/30 & clones	DEI 400862, D600A ¼" cart	—	1.3Mb/min	6	87Kb	6400	NRZ	✓	—	✓	10	✓	✓
Cipher F880/Cipher Data Products Inc	$9900	R to R	Ex	45/80Mb	Rack/ bench mounted	Full compatibility	½" computer tape	5Mb/min	2Mb/min	9	120Kb	1600/3200 or 6250 GCR	PE/GCR	✓	✓	✓	10	✓	✓
Cipher 5400/Cipher Data Products Inc	$3480	Cart	Ex	60Mb	Full	PC XT, AT, System 2/30 & clones	DEI 400862, D600A ¼" cart	4.5Mb/min	1.5Mb/min	9	87Kb	8000	NRZ	✓	✓	✓	10.5	✓	✓
Cipher ST125F/Cipher Data Products Inc	$2934	Cart	In	125Mb	Half	PC XT, AT, System 2/30 & clones	DEI 400862, D600A ¼" cart	4.5Mb/min	1.5Mb/min	15	—	—	GCR	✓	✓	✓	10.5	✓	✓
Cipher ST60F/Cipher Data Products Inc	$2580	Cart	In	60Mb	Half	PC XT, AT, System 2/30 & clones	DEI 400862, D600A ¼" cart	4.5Mb/min	1.5Mb/min	9	80Kb	8000	NRZ	✓	✓	✓	10.5	✓	✓
Guardian Data — 57-59 Alleyne St, Chatswood, NSW 2067. Tel: (02) 406 6144																			
Net File 120/Systen Inc	TBA	Cart	Int/Ex	120Mb	Half	PC XT, AT, System 2/30 & clones	DC600 ¼" cart	—	✓	15	—	10,000	GCR	✓	—	✓	10	✓	✓
Bridge Tape/Sysgen Inc	$1623	Cart	Ex	42Mb	Half	PC, XT, AT & clones PS/230, 50, 60	DC200	—	✓	24	250 or 500Kb	8621	IBM comp. double density MFM floppy disk format	—	—	✓	40	✓	✓
Smart Image 60/Sysgen Inc	$1800 (Int) $2097 (Ext)	Cass	In/Ex	60Mb	Half 5¼"	IBM PC XT, AT clones	Maxell 60 cass	✓	✓	9	90Kb	8000	GCR	✓	—	✓	10	✓	✓
QIC File/Sysgen Inc	$2566 (Int) $2726 (Ext)	Cart	In/Ex	60Mb	Half 5¼"	PC, XT, AT & clones	DC600 cart	✓	✓	9	90Kb	8000	GCR	✓	—	✓	10	✓	✓
Durapak/Sysgen Inc	$4017 (Int Rem) $5022 (Ext Rem)	Removable Cart	In/Ex	30Mb	—	PC XT, AT, System 2/30 & clones	Duradisk	—	—	—	7.5M-bits/ sec	—	—	—	—	—	10	✓	✓
TFT-42/Sysgen Inc	$1399	Cart	In	44Mb	Half 5¼"	PC, XT, AT & clones, System 2	DC200	—	✓	24	250/500Kb	8621	MFM	✓	—	✓	40	✓	✓
IBM Australia Ltd — 5 Coonara Ave, West Pennant Hills, NSW 2120. Tel: (02) 634 8688																			
3430-AOI/IBM	$51,320 (ex tax)	R to R	Ex	180Mb	Full	Full	½" tape	312.5Kb/ sec	Variable	9	312.5Kb	1600/6250	PE/GCR	—	Host ctrl	✓	—	✓	✓
3430-BOI/IBM	$25,970 (ex tax)	R to R	Ex	180Mb	Full	Full	½" tape	312.5Kb/ sec	Variable	9	312.5Kb	1600/6250	PE/GCR	—	Host ctrl	✓	—	✓	✓
3420-8 Tape Drive/IBM	$30,990 (ex tax)	R to R	Ex	180Mb	Half	Full	½" tape	1.25Kb/ sec	Variable	9	1.25Mb	1600/6250	PE/GCR	—	Host ctrl	✓	—	✓	✓
3803-2 Control Unit/IBM	$41,050 (ex tax)	R to R	Ex	180Mb	Half	Full	½" tape	1.25Mb/ sec	Variable	9	1.25Mb	1600/6250	PE/GCR	—	Host ctrl	✓	—	✓	✓
3480-A11 Control Unit/IBM	$79,410 (ex tax)	Cart	Ex	200Mb	Half	Full	Comact cartridge	1.5Mb/ sec	500Kb/ sec	18	1.5Mb	38,000	AXP	✓	Host ctrl	✓	—	✓	✓
3480-B11 Tape Drive/IBM	$52,340 (ex tax)	Cart	Ex	200Mb	Half	Full	Compact cartridge	1.5Mb/ sec	500Kb/ sec	18	1.5Mb	38,000	AXP	✓	Host ctrl	✓	—	✓	✓
3480-A22 Control Unit/IBM	$101,800 (ex tax)	Cart	Ex	200Mb	Half	Full	Compact cartridge	3Mb/sec	500Kb/ sec	18	3Mb	38,000	AXP	✓	Host ctrl	✓	—	✓	✓
3480-B22 Tape Drive/IBM	$67,100 (ex tax)	Cart	Ex	200Mb	Half	Full	Compact cartridge	3Mb/sec	500Kb/ sec	18	3Mb	38,000	AXP	✓	Host ctrl	✓	—	✓	✓
6157 Streaming Tape Drive/IBM	$3632	Cass	Ex	55Mb	—	PC, System 2	¼" tape	4.5-4.8Mb/ min	3.8-4.6Mb/ min	—	—	—	—	—	—	—	—	—	—
IDEAssociates — Suite 1602, 500 Oxford St, Bondi Junction, NSW 2033. Tel: (02) 387 5222																			
IDEAtape (internal)/IDEAssociates	$2995	Cart	In	60Mb	Half	PC XT, AT & clones, System 2/30	¼" tape	4.7Mb/min	✓	9	90Kb	8000	QIC 24/36	✓	—	✓	5	✓	✓
IDEAtape (external)/IDEAssociates	$3945	Cart	Ex	60Mb	Half	PC XT, AT & clones, System 2/30	¼" tape	4.7Mb/min	✓	9	90Kb	8000	QIC 24/36	✓	—	✓	5	✓	✓
Imagineering — 77 Dunning Ave, Rosebery, NSW 2018. Tel: (02) 697 8660																			
TD4340/Mountain Computer Inc	$1420	Cart	Ex	40Mb	Half	PC/XT & compatibles	DC2000 ¼" tape	1.2Mb/min	—	20	250Kb	10,000	MFM	✓	—	✓	12	✓	✓
TD4340/Mountain Computer Inc	$1189	Cart	In	40Mb	Half	PC/XT & compatibles	DC2000 ¼" tape	1Mb/min	—	20	250Kb	10,000	MFM	✓	—	✓	12	✓	✓
TD4440/Mountain Computer Inc	$1303	Cart	In	40Mb	Half	IBM PC/AT, System 2/60	DC2000 ¼" tape	2Mb/min	2Mb/min	20	500Kb	10,000	MFM	✓	—	✓	12	✓	✓
TD4440/Mountain Computer Inc	$1785	Cart	Ex	40Mb	Full	PC/AT, System 2/30, 50, 60	DC2000	2Mb/min	—	20	500Kb	10,000	MFM	✓	—	✓	12	✓	✓
Internal Filesafe 60/ Mountain Computer Inc	$2895	Cart	In	60Mb	Half	PC/XT/AT	DC600A	5Mb/min	—	9	90Kb	10,000	MFM	✓	—	✓	5	✓	✓
Mini Mountain External 60/ Mountain Computer Inc	$3120	Cart	Ex	60Mb	Half	PC/XT/AT	DC600A	5Mb/min	—	9	90Kb	10,000	MFM	✓	—	✓	5	✓	✓
125Mb Filesafe	$4545	Cart	Ex	125Mb	Full	PC/XT/AT	600A	5Mb/min	—	15	90Kb	10,000	GCR	✓	—	✓	15	✓	✓
Keydata Pty Ltd — 530 Little Collins St, Melbourne 3000. Tel: (03) 62 2905																			
Qualstar Model 1052	$9048 inc s/w, card & cables	R to R	Ex	Up to 130Mb	—	PC XT, AT, System 2/30	½" tape	3-4Mb/min	3-4Mb/min	9	80Kb	1600/3200	PE	✓	—	✓	10	✓	✓

Key: ✓ = Feature available; — = Feature not available or information not supplied; PoA = price on application; Cart = cartridge; R to R = Reel-to-Reel; Cass = Cassette; In = Internal; Ex = External; REM = Removable; ips = inches per second.

The Product Spotlight on IBM-compatible tape-drives is based on a survey of tape-drive vendors and suppliers conducted between June 22 and August 14, 1987. All details should be checked with the respective companies as listed.

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								Backup speed											
Product Model/Manufacturer	Price ($A inc tax)	Cartridge/Reel-to-reel/Cassette	Internal/EXternal	Formatted storage capacity (M-bytes)	Form factor Full/Half-height	IBM-compatibility	Media	Streaming mode (M-bytes/min)	File by file mode (M-bytes/min)	Number of tracks	Data transfer rate (K-bytes/sec)	Recording density (bits per inch)	Recording code	Unattended backups	Password protection	CRC error detection	MTBF ('000 power on hours)	Documentation	Warranty
Memorex Pty Ltd — 61 Barry St, Neutral Bay, NSW 2089.																			**Tel: (02) 908 2211**
3228/Memorex	PoA	R to R	—	—	Full	Full IBM compatibility	Open reel	—	—	9	1250Kb	6250	GCR/PE	—	—	—	—	—	✓
3288/Memorex	PoA	R to R	—	—	Half	Full IBM compatibility	Open reel	—	—	9	1250Kb	6250	GCR/PE	—	—	—	—	—	✓
3266/Memorex	PoA	R to R	—	—	Half	Full IBM compatibility	Open reel	—	—	9	781Kb	6250	GCR/PE	—	—	—	—	—	✓
5480/Memorex	PoA	Cart	—	—	Equiv. to IBM 3480	Full IBM compatibility	3480 cart	—	—	18	3000Kb	37867	AXP	—	—	—	—	—	✓
Micro General Pty Ltd — 58 Atchison St, St Leonards, NSW 2065.																			**Tel: (02) 439 8400**
Tape Backup Identica	PoA	Cart	In/Ex	60Mb	Half	PC, XT, AT, System 2/30 & clones	DC600A ¼" cart	5Mb/min	3Mb/min	9	88Kb	10,000 FRPI	QIC 24/36	✓	✓	✓	12	✓	✓
National Advanced Systems Pty Ltd — 11-17 Khartoum Rd, North Ryde, NSW 2113.																			**Tel: (02) 887 4455**
7440 A1/B1	$6730/$35,851	R to R	Ex	165/320Mb	Full	3420-8	Reel	1.25Mb/sec	1.25Mb/sec	9	1250/3000Kb	1600/6250	—	—	—	—	—	—	✓
7480 A22/B22	$113,736/$76,357	Cart	In	200/600Mb	Half	3480	Cart	3Mb/sec	3Mb/sec	18	3000/6000Kb	38,000	—	—	—	—	—	—	✓
Peridata Communication Pty Ltd — Suite 46, 'Chatswood Village', 47 Neridah St, Chatswood, NSW 2067.																			**Tel: (02) 412 3277**
PD-125I	$2420	Cart	In	125Mb	Half	PC XT, AT, System 2/30 & clones	DEI 400862 & DC600 ¼" cart	4.5Mb/min	2Mb/min	15	90Kb	—	GCR	✓	✓	✓	10.5	✓	✓
PD-60I	$1964	Cart	In	60Mb	Half	PC XT, AT, System 2/30 & clones	DEI 400862 & DC600 ¼" cart	4.5Mb/min	2Mb/min	9	80Kb	8000	NRZ	✓	✓	✓	10.5	✓	✓
PD-525/39	$1800	Cart	Ex	25Mb	Full	PC XT, AT & all clones	DEI 400862 & DC600A ¼" cart	—	1.3Mb/min	6	32Kb	6400	NRZ	✓	—	✓	10	✓	✓
PD-60	$2880	Cart	Ex	60Mb	Full	PC XT, AT, System 2/30 & all clones	DEI 400862 & DC600A ¼" cart	4.5Mb/min	2Mb/min	9	87Kb	8000	NRZ	✓	✓	✓	10.5	✓	✓
Prima Australia — Unit 6, 49-51 Salisbury Rd, Asquith, NSW 2078.																			**Tel: (02) 476 5760**
Caliper/Nakanichi (licence)	$1450/1750 (60Mb) $1950/2250 (125Mb)	Cart	In/Ex	60/125Mb	Half	IBM PC XT, AT, System 2 & clones	¼" cart	—	variable	9/15	90Kb	8000/10,000	NRZI	✓	✓	✓	10+	✓	✓
Identica/SMS (Scientific Microsystems)	$1550/1850 (60Mb) $2050/2350 (125Mb)	Cart	In/Ex	60/125Mb	Half	IBM PC XT, AT, System 2 & clones	¼" cart	—	variable	9/15	90Kb	8000/10,000	NRZI	✓	✓	✓	10+	✓	✓
ADIC 400 Floppy Tape System	$1200 (Int) $1610 (Ex)	Cart	In/Ex	32/40Mb	Half	IBM PC XT, AT, & clones	DC300 cart	Up to 2Mb/min	—	24	Up to 500Kb	8621	MSM	✓	—	✓	20+	✓	✓
Ski Peripherals — 7-9 Merriwa St, Gordon, NSW 2072.																			**Tel: (02) 489 6611**
Tandberg Internal/External	$2100/$2700	Cart	In/Ex	60Mb	Half	✓	DC600A	5Mb/min	1.5Mb/min	9	88Kb	8000	GCR	✓	✓	✓	10+	✓	✓
ADIC Internal/External	$2600/$2900	Cart	In/Ex	32Mb	Half	✓	DC2000	60Kb/sec	385Kb/min	24	21Kb	12,500	—	✓	✓	✓	10+	✓	✓
Strategic Computer Services (Australia) Pty Ltd — 44 Avenue Rd, Mosman, NSW 2208.																			**Tel: (02) 969 8899**
Irwin Tape Backup System/ Irwin Magnetics	$1100-$2000	Cart	In/Ex	10/20/40/64Mb	Half	IBM PC XT, AT System 2/30, 50	DC1000/DC2000	Up to 20Mb in 8min	Up to 20Mb in 8min	8 to 20	250 to 750Kb	6400-10,000	MFM	✓	—	✓	12	✓	✓
Tallgrass Technologies Australia — 34 East St, Five Dock, NSW 2046. — 16 Albert Sq, 37-39 Albert Rd, Melbourne, Vic 3004.																			**Tel: (02) 712 2010 Tel: (03) 820 0100**
TG1020i	$1899	Cart	In	20Mb	Half	IBM PC XT, AT & clones	DC2000 tape	1.5Mb/min	1.5Mb/min	12	750Kb	10,000	GCR	✓	—	✓	10	✓	✓
TG1040i	$2399	Cart	In	40Mb	Half	IBM PC XT, AT & clones	DC2000 tape	3Mb/min	3Mb/min	24	750Kb	10,000	GCR	✓	—	✓	10	✓	✓
TG4060e	$3990	Cart	Ex	60Mb	Various	IBM PC XT, AT & clones	DC600/DC615A ¼" tape	—	—	11	60Kb	9600	GCR	✓	—	✓	10	✓	✓
Thorn EMI Information Technology — 111 Wicks Rd, North Ryde, NSW 2113.																			**Tel: (02) 887 3233**
9800/9900 M4 Data	$6600	R to R	Ex	120Mb	Various	PC XT, AT & clones, System 34/36	½" tape	✓	✓	9	250Kb	800/1600/3200	NRZ/PE	✓	—	✓	10+	✓	✓
Y Micro Computers — 390 Oxford St, Mount Hawthorn, WA 6016. — Level 6, 1st National House, 2 Bligh St, Sydney 2000.																			**Tel: (09) 443 1555 Tel: (02) 232 2579**
Scorpion 594SC/Archive	$1580	Cart	In	60Mb	Half	PC XT, AT & clones	ANSI STD. X3.55-1982 ¼" tape	5Mb/min	—	9	90Kb	8000	RLL	✓	—	✓	5+	✓	✓
Fastape FT-60/Archive	$1880	Cart	Ex	60Mb	—	PC XT, AT & clones	ANSI STD. X3.55-1982	5Mb/min	—	9	90Kb	8000	RLL	✓	—	✓	5	✓	✓
Archive XL 3240/5240/3540/5540	$950	Cart	In	40Mb	Half	PC XT, AT & clones	DC2000	—	—	20	250Kb	10,000	MFM	✓	✓	✓	12+	✓	✓

Key: ✓ = Feature available; — = Feature not available or information not supplied; PoA = price on application. Cart = cartridge; R to R = Reel-to-Reel; Cass = Cassette; In = Internal; Ex = External; REM = Removable; ips = inches per second.

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The SNA challenge

Elizabeth Horwitt reports on offerings from third-party vendors.

THE accelerated drive toward a fully functional distributed Systems Network Architecture communications system by IBM is likely to limit MIS managers' choice of SNA frontend processor vendors but broaden offerings from third-party SNA software retailers. Companies like Communications Solutions and Cincom Systems have already started bringing out new SNA connectivity tools and applications designed to ease users' passage to the new distributed environment.

However, several third-party communications processor vendors contacted recently appeared to be having trouble keeping up with IBM's rapid stream of updates to its frontend processor architecture while maintaining their products' added value. This has discouraged some MIS managers from looking outside of IBM's domain for their communications hardware.

Support for IBM's Network Control Program is one stumbling block. "We have looked at the possibility of buying our frontend processors from (NCR Corp subsidiary) NCR Comten, but they do not maintain current NCP support," said Dan Schultz, manager of network support at a banking consortium. "The way we are growing, we want to get IBM's new Network Control Program features as soon as they appear."

> ‘ *It is a dangerous game. If NCR Comten gets ahead of IBM, it will have to backtrack when IBM introduce similar capabilities.* ’

Two such capabilities recently promised by IBM are dynamic reconfiguration and frontend processor support of IBM's PU2.1 peer-to-peer communications. "This will mean major functionality that people like NCR Comten have got to get for their own products," said David Passmore, a principal at research company Network Strategies.

"NCR Comten has to come up with IBM's functions and features plus its own value added," Passmore said. "That is a dangerous game, because if it gets ahead of IBM, it will have to backtrack when IBM introduces similar capabilities."

Unisys and Control Data Corp, which recently entered the SNA communications processor market, are also playing catch-up with IBM's NCP enhancements, Passmore said.

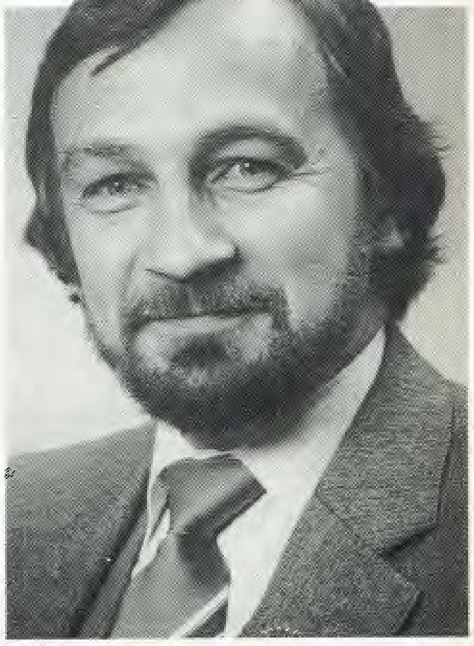
Amdahl, whose frontend processors were designed to run IBM software unchanged, does not have the problem of keeping up with IBM's latest NCP features, according to Passmore. However, IBM has made it difficult for Amdahl to copy its highend frontend processor, the 3725, by changing the microcode three times, he added.

Communications processor vendors like NCR Comten and Netlink can offer greater networking flexibility and multi-vendor support than IBM because they are less firmly tied to the vendor's host environment, Passmore said. IBM's recent introductions threaten to eliminate some of those advantages.

Netlink spokesman Richard Buckle said: "What really affects us is the PU2.1 support on IBM's frontend processor, which will allow multiple (IBM) System/36s and their resources to talk to each other across an SNA network." This capability, which Netlink now offers, will not be available from IBM until a new NCP version arrives sometime late in 1988, Buckle said.

NCR Comten feels "hobbled by our need to conform to IBM's current NCP," said Eric Birkeland, the company's director of product marketing. "Users have demanded dynamic reconfiguration from us, just as they have from IBM," but NCR Comten, like IBM, will not be able to offer this capability until the new NCP comes along. "Changing to a new NCP will be difficult for us and IBM," Birkeland noted.

On the other hand, managers at two major IBM sites said they would never consider bringing a third-party communications processor into their SNA networks.



■ *Netlink spokesman Richard Buckle*

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Seeking a way into publishing

Seamless integration the goal, writes Jean Bozman

IBM is taking a systems approach to publishing — co-ordinating the development of its personal computer and workstation products with host systems' existing publishing applications at the company's publishing systems facility here.

The vendor said it hopes to create a seamless integration of publishing throughout a corporation, gaining an edge against competing products from Apple Computer and manufactuers of IBM Personal Computer lookalikes.

"The strategy of combining PC and host solutions is clearly an advantage to us," said Jeff Mason, general manager of IBM's Publishing Systems Business Unit. "We think we will be very competitive at each edge of the offerings." IBM said it intended to link off-the-shelf products, like its Personal System/2 line and RT Personal Computers, with host-based publishing systems through software. Host-based software would convert PC-generated documents to a standard markup language, enabling host processors to assemble a final, standard document no matter where the documents originated.

The fledgling publishing unit, formed a year ago to give IBM a quick break into the $US1200 million market, began delivery of two publishing Solutionpacs last month. Because it got a late start, IBM said, the company plans to build the new publishing business on two large bases of installed IBM machines: PCs and mainframes.

IBM is searching for a considerable chunk of the market, which is expected to grow to $US600 million by 1990. "We are interested in publishing because it is a growth industry," said Damon Trimble, a senior marketing specialist.

To speed development of publishing-related hardware, software and peripherals, the publishing business unit will use IBM's marketing and development teams as needed. "We're not married to IBM — but we're certainly dating," Trimble said. "We would like to be close to them, but we are free, as an independent business unit, to actively seek outside products to fill the product gaps."

Once the products are ready, IBM's sales force will promote and distribute them. Parent IBM is never far away from the business unit, according to publishing officials. General managers of IBM mainline divisions, including the Entry Systems Division, sit on the board of the publishing unit in order to speed up PC hardware developments needed in the publishing area.

For the moment, IBM is offering end users publishing solutions for both the desktop and the host machine under IBM's VM operating system. But as time goes on, host-based and PC-based systems could merge. "Today, you've got personal publishing on the desktop," Trimble said. "Tomorrow, it won't matter where it is."

That would be especially true for users on a corporate network, who might receive publishing support from a mainframe 800km away from their desktops.

So far, IBM has limited desktop publishing offerings to IBM PC AT and PS/2 Model 30 users. Called the Personal Publishing Solutionpac, the package teams a PS/2 Model 30, an IBM 4216 printer and Microsoft Corp Windows applications. That system costs $US8553.

The printer and the software can also be added to a user's AT as a field upgrade that costs $US5793. Versions for the PS/2 Models 50, 60 and 80 have not yet been announced.

"We've put all of our desktop publishing products on a standard PC platform," Trimble said. "But while these are standard products, we're going to integrate them as much as possible in favour of IBM." One example of IBM's unique integration is the inclusion of an Adobe Systems Postscript board within the PC's housing rather than in the printer. The design is said to boost performance and speed output to the printer.

On the host end, IBM announced the Publishing System VM Edition in April. It supports the preparation of documents composed by more than one author and under IBM's Advanced Function Printing software.

After formatting the documents can be printed by IBM 3812 and 3820 pageprinters, the IBM 3800 laser printer or an IBM 4250/II Electrocompositor, which producers camera-ready masters.

"A host-based markup language will allow customers to handle relatively lengthy documents and to generate global changes throughout a text," Mason said. "It's a very important feature in any industrial strength kind of system."

The host in question can be an IBM 3090, 4300 or 9370 running IBM's MVS, OS, VM or Dos, all of which support the firm's Doument Composition Facility — the anchor of all host-based IBM publishing solutions. Mason said that IBM now offers the host-based markup language and that the company is adapting it for workstation applications. Solutionpacs for operating systems other than VM have not yet been announced.

The desktop presents a different set of challenges, Mason added. The individual author wants to print out what appears on the screen. That capability, called what you see is what you get (WYSIWYG), is recommended for department newsletters, presentations and the like, Trimble said.

IBM suggests a more standard format, designed by corporate committees, for large enterprises that create large documents such as product manuals and insurance policies.

For such applications, the distinction between desktop and host-based systems may blur by the 1990s, Mason suggested. "Over time, we would see migrating the capability of desktop publishing to the higher capacity system," he added. A development team of more than 100 IBM staffers in Colorado is working to give host-based systems the flexibility of PC-based systems and the ability to structure files sent from PCs to host systems.

It may be a year or more before IBM's integrated systems are fully featured. Missing now are desktop products that can produce documents compatible with final-form markup language commands and host-based systems that can produce WYSIWYG files.

> ‘ ***Especially strong interest has come from the insurance, pharmaceutical, automative and retail fields*** ’

The lack of flexibility means that for now, users must match their application to the host or the PC system of choice. "Where a document starts is a function for the type of work, the complexity of the document and how many authors there are," Mason said. "You can do long documents on the personal publishing system as well as short documents on the host-based system."

Since April, more than 100 IBM customers have bought the new solutions, according to Merry Quackenbush, director of media industry and publishing systems for IBM. Quackenbush, who designs the publishing industry marketing programs, said that especially strong interest has come from corporations in the insurance, pharmaceutical, automotive and retail fields.

In the US IBM is prepared to brief any interested customers at its Colorado campus and at any executive briefing facility in Dallas. But the company is also training more than 200 publishing specialist who will be stationed at IBM branch offices nationwide. "The specialist support is included with the sale of the Solutionpacs," Quackenbush says. "Our publishing specialists are the first line of defence for the customer."

IBM pioneered the combination of workstation and host-based publishing for internal use. IBM produces 5,000 books, reports and manuals each year, Trimble said, that are prepared by 1,700 technical writers at 25 IBM facilities around the world. IBM creates one million camera-ready masters a year, placing the compant second only to the Federal government as the largest inhouse printing operation, IBM said.

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A special report on Australia's largest finance corporation, AGC

AUSTRALIAN Guarantee Corp Ltd, the largest finance company in Australia, has a high degree of programmer productivity within its IBM IMS/DC environment. In fact, the company has won recognition for its high-level productivity.

During a recent IBM competition, for instance, AGC projects were considered most productive, one of nine companies and 36 projects evaluated using function point analysis.

But as anyone who has worked in it knows, the IBM IMS/DC environment is both demanding and complex. In an IMS shop, more than 500,000 transactions a day is the norm, with a similar volume of network traffic. Applications programs running "above" IMS can typically involve 200 screen program systems and 400,000 lines of Cobol.

The complexity comes from the very nature of IMS: the software environment is one of the few capable of handling large volumes of data while at the same time providing the security and data integrity needed for large scale online operations.

> ***'Training people in these skills is time-consuming and costly . . . and they do not use all the skills often enough to remain completely productive'***

Today, AGC has made a four to five-fold leap in productivity, and believes it has found the only product available that addresses productivity in the IBM environment without detracting from the initial investment. The company recently signed an order for Telon, the complete application development productivity system for the IMS-DEC and CICS environments from Pansophic Systems Australasia.

Since purchasing its first computer system only six years ago, AGC has been automating the financial applications which previously were managed by a "very good manual system". Most of the basic financial applications are up and running, but naturally there is still a great deal to do, most particularly because of the extremely intense competition between financial institutions since deregulation.

Since joining AGC three years ago, systems development manager Michael Eakin has been looking closely at the issue of development complexity. His 15 years of experience with working in large-scale IBM environments has left him concerned by the extreme complexity of application development.

"I accept the difficulties, because nothing except the large IBM mainframe environment could keep our Australia-wide and international network up and going as well as IBM system software, data communications and database management software. But having grown up with the complexity of developing applications in this environment, I see the answer to the issue of productivity in finding products able to aid development, which are both easy to use and able to consolidate the skills and technical requirements," Eakin said.

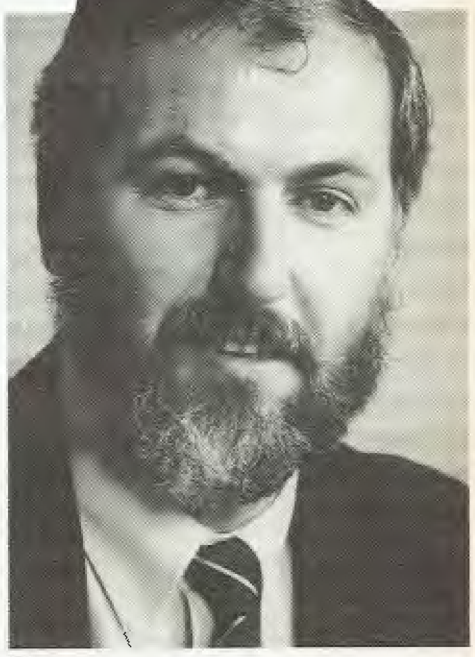
AGC has two IBM 3090 mainframe systems. Eakin said the programmer in the IBM environment needs to master up to 50 different products or skills in order to be completely productive.

"Training people in these skills is very time-consuming and costly. And of course people do not use all the skills frequently enough to remain completely productive.

"We have spent a lot of time looking at ways of implementing systems which would decrease the number of skills needed, while allowing development effort to concentrate on business solutions," he said.

"While we do use other products which go part of the way there, generally these are not suited to a sufficiently wide range of applications. They are either online or

(Continued page 50)



■ ***AGC's Michael Eakin***

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(Continued from page 49)

Productivity plus

batch, but never both, and they do not always fit into the rest of the environment."

When Pansophic announced the availability of Telon in April last year, AGC had a look at the product and then set up a project team to evaluate it. The project team started its work in August, 1986.

The team set out to complete one of the projects on AGC's books, and performed a review of user requirements as part of the project evaluation criteria. They also went through the formal presentation and review cycle in designing the project.

"In the IMS/DC environment we estimated it would take about 5.6 man-months to complete the programming phase of the project," Eakin said. "Using Telon, the project was completed in just two man-months."

Over the life of the project the team achieved 11,000 lines of Cobol code — the equivalent of 56 lines of tested Cobol code an hour. The normal rate at AGC, without Telon, is between 15 and 20 lines an hour.

"The team achieved a productivity factor of 1.66 over the total project. This increase in productivity means we can put much more effort into the design phase," Eakin said. Since those initial trials, the overall productivity gain has been of the order of 2.5-fold.

"This overall figure was reduced somewhat by earlier efforts where inexperience slowed us down. Later development showed in the order of a four or five-fold productivity gain," Eakin said.

"Furthermore, in batch programming — an area where we were not seeking to increase productivity a great deal — we are now one-and-a-half times more productive. And Telon has won the ready acceptance of the developers. They are extremely enthusiastic about it, and particularly like its ease of use.

"Better still, the complexities of IMS are completely shielded from the programmer, and Telon assists people in understanding the concepts of IMS."

Eakin said another major feature was the extensive online interactive test facility, which allows programmers to test programs under Telon long before the IMS environment is set up.

"This increases the productivity of the testing phase very significantly. The testing phase is one of the longest phases of development, so the facility leads to a big jump in productivity.

"And the fact that one product can handle both batch and online development is of major importance. I do not care what anyone said, there is almost always a batch component to any system," Eakin said.

Before evaluating the software, Eakin was told that it could achieve a 10 to 30-fold increase in productivity in program maintenance.

"I simply did not believe it," he said. "Then, during our evaluation exercise, a number of things were pointed out to me. For instance, significant maintenance gains comes from the way Telon produces structured code. The cross referencing generated by Telon means systems are better documented.

"And programs generated by Telon all follow a similar structure, so that people readily understand the structure of any new program. All these factors lead to significant productivity gains. I can therefore see substantial opportunity for increasing what is becoming a more and more important part of our business — maintaining our installed application base.

"Another point is that the system development life cycle changes with Telon. Telon is integrated into the whole life cycle, not just the development stage, letting us build greater flexibility into our products, and in less than a third of the time," he said.

To AGC the benefits are obvious, including the fact the Telon is expected to pay for itself in less than two years from purchase.

"Then I expect it to assist us by putting new products into the marketplace and allowing us to meet the challenges of the deregulated financial market. It is the only product I have seen in the past 10 years that really addresses productivity in our environment, but does not take away from the existing investment in products developed for that environment," Eakin said.

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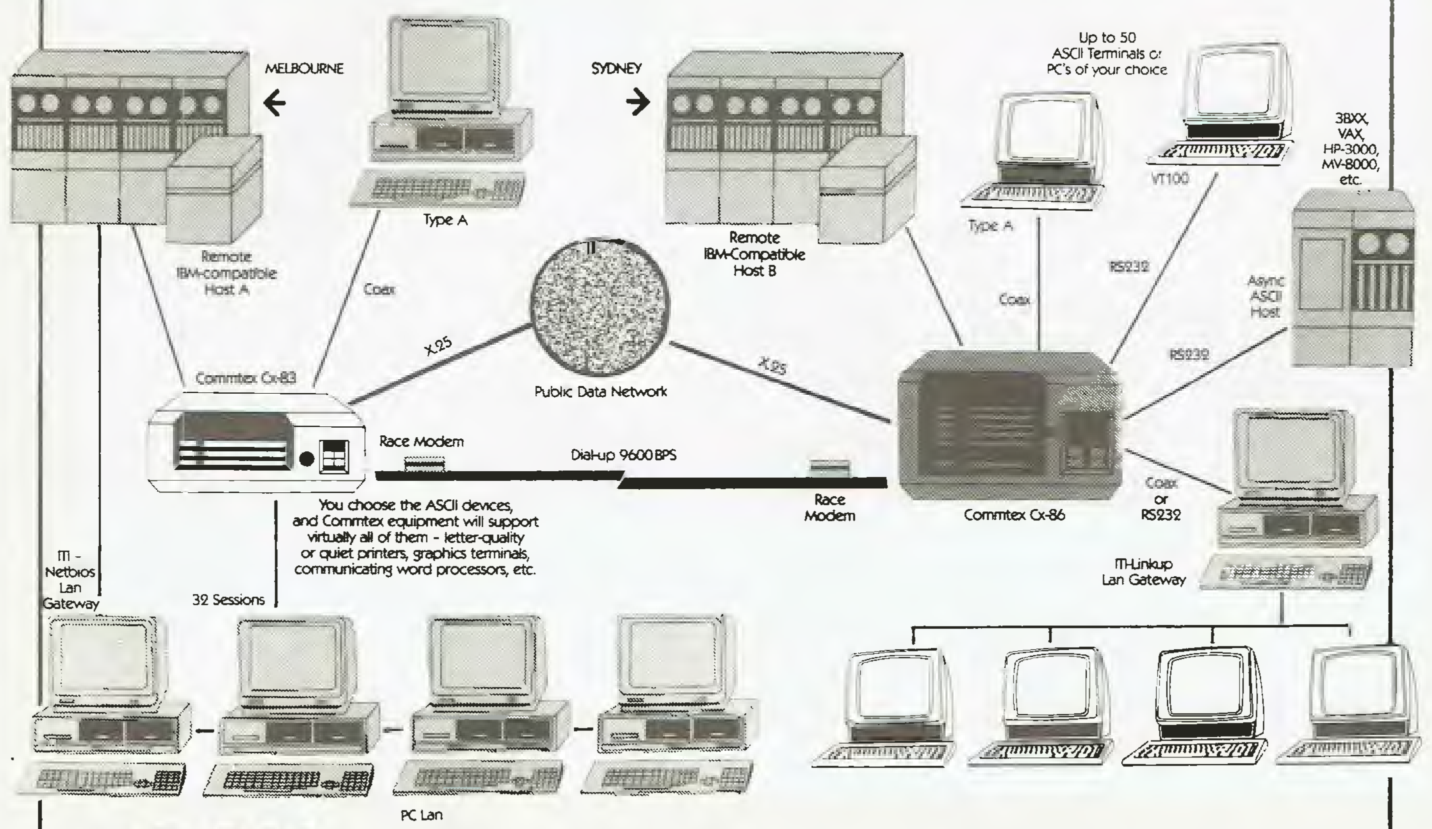
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A promise of closer links

Since its inception in 1969 by two ex-IBM employees, McCormack & Dodge has worked closely with IBM on product strategy and development, and with about 80 per cent of its worldwide user base running IBM hardware, M&D has welcomed IBM's recent promise of even closer ties between itself and its major third party software vendors.

Barrie Williams, general manager, M&D Australasia, sees IBM's move last month to reorganise its application software resources and formalise its co-operative efforts with independent software vendors as a positive one.

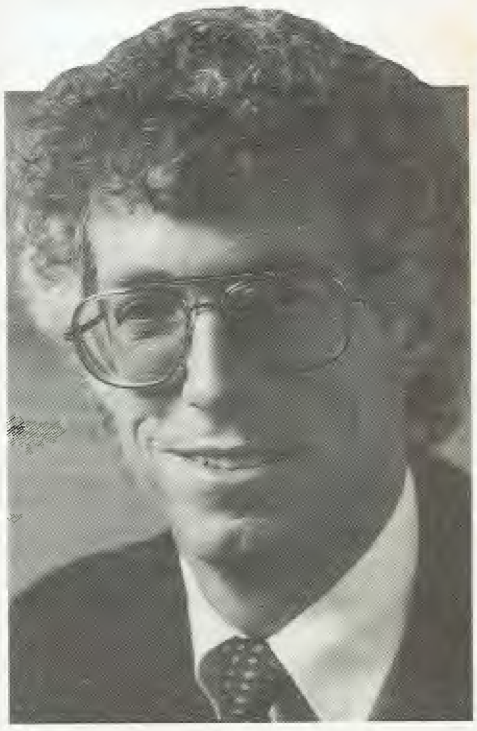
"It makes sense for them and I think it will be quite helpful to us," he said. "They need to get as many third party vendors developing software for SAA as they can. The more software running on their machines, the more hardware they're going to sell."

McCormack & Dodge received assurance from IBM after its announcement that there would be "absolutely no competitive threat" in the area of integrated financial information software now covered by M&D.

In Australia, a number of recent M&D orders have been received from IBM customers, including the Australian National Library, which is implementing M&D's General Ledger, Accounts Payable, Accounts Receiveable and Purchase Order packages on its recently installed IBM 3081 machine.

Vital to add value

A new era is dawning, and Unix will have an important role



■ *Tom Frana . . . link to DEC*

SUPPLIERS of computer hardware and software which is functionally similar to that supplied by IBM are moving into a new era. In the past, such suppliers have built their reputation on providing equipment with a better price/performance ratio than IBM's and backed this with very high service levels.

Evidence that plug-compatible suppliers are successful in this strategy comes from the fact that more than half the revenues for such suppliers are generated from sales to existing customers.

Building on this strategy, alternative suppliers to IBM are tailoring their marketing plans to fit more closely the changing direction of the computing requirements of their customers.

For example, in the past few years, there has been a growing call from computer users for generic operating environments. Unix has emerged as one of the favourite environments. In the future it is likely that Unix will co-exist with IBM's operating systems as the preferred operating environments. For many applications it is likely users will specify Unix as the preferred operating system.

Because it is being offered by an increasing number of suppliers, Unix gives users a measure of independence from hardware manufacturers.

The ease with which Unix-based applications can be moved to various systems means some companies will use their centralised IBM-compatible environment to develop the applications for distribution to other locations in the company.

The push in this direction is significant in having come from the user community. Computer users are demanding a more standardised approach to computing.

Many of the managers rising through the ranks of the user community have had a broad exposure to the Unix environment, for example, in their student days.

Growth path

Suppliers in the IBM-compatible enviroment are responding to this user demand.

Moving in this direction, National Advanced Systems has agreed to develop a version of Sun Microsystems' Sunos operating systems for use on NAS mainframes. Sunos is a version of Unix.

NAS and Sun will also collaborate on the development of communications software for use on NAS mainframes.

It is probably the first time two major data processing suppliers have agreed to jointly develop and support a single open operating system and communications effort.

The move means users of Sun computers will have a growth path upwards into the IBM-compatible world.

In a separate move, NAS has also announced it will work with Interlink Computer Sciences to develop hardware and software products that will link IBM-compatible mainframes with computers from DEC.

"Recognition of our customers' growing needs to connect dissimilar architectures — both processor and software systems — caused us to seek this relationship for new products," said Tom Frana, vice president and general manager for NAS.

Under the terms of the agreement between NAS and Interlink, a review committee with representatives from both companies will recommend new products for joint development by the two companies.

Those products will be sold by NAS for installation on NAS computer systems.

NAS is also working on its own account at enhancing its product line with the development of vectorisation of software for its mainframes.

The company has established a systems software development centre at Atlanta, Georgia, which it is staffing with the best software professionals available.

The centre will also work with Clemson University in South Carolina on vectorised software for commercial computer users.

With such software operating on the NAS AS/XL series of mainframes, users can expect performances approaching that of a supercomputer when running numerically intensive jobs while also performing normal day-to-day commercial data processing.

These moves by NAS highlight the company's strategy to be seen as a preferred supplier in its own right rather than just an alternative to IBM.

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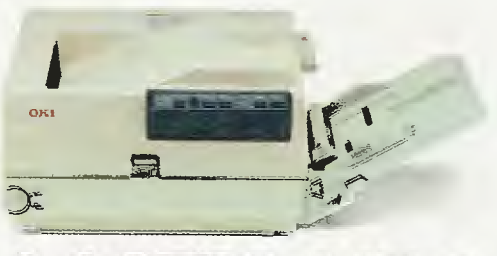

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Aging XA's days may be numbered

Technology catching up, says Jeffry Beeler

IBM's Extended Architecture (XA) still probably has a number of years to go before it reaches the end of its useful life. But technology is already beginning to overtake XA, as a recent hardware announcement by National Advanced Systems Corp (NAS) demonstrates.

Included in the announcement was word that NAS has technologically overhauled its entire AS/XL mainframe series to allow the Sierra-class machines to expand to 2G-bytes of main memory, the largest amount XA can architecturally accommodate. The refinements, which quadrupled the AS/XL line's internal storage size across the board, make NAS the first vendor to bump up against the 2G-byte limit.

Part of the increase in main memory resulted from the replacement of the processor family's existing 256K-bit random-access memory (Ram) chips with parts that are four times more sophisticated. But the addition of 1M-bit Rams is only half the story behind the AS/XL's expanded capacity.

The other half has to do with NAS's recent adoption of 64K-byte storage protection arrays, the densest in industry history, according to Carl Claunch, the company's director of systems marketing. Previously, all five models in the AS/XL series used 16K-byte arrays.

To understand why improved storage protection is so crucial to the company's latest hardware enhancements requires some basic knowledge of how IBM CPUs manage their main memory.

Every system that conforms to Series/370 architecture divides its internal storage into pages containing a specified number of kilobytes. To ensure data integrity, the architecture further requires the systems to maintain a fixed proportion of main memory to storage protection, which prevents a bug in one program from causing trouble in another. The more Ram a mainframe supports, the more storage protection it demands.

Like the AS/XL series, IBM's recently introduced 3090E family incorporates 1M-bit components. But because the circuit technology is shackled with 8K-byte storage protection arrays, Big Blue's maximum main memory is restricted to 256K-bytes, just an eighth of what a fully configured AS/XL-90 or AS/XL-100 holds.

Likewise, Amdahl Corp's 5890-series processors are equipped only with 16K-byte arrays and are therefore constrained from expanding beyond 512K-bytes of internal storage.

Some day, both IBM and Amdahl will, reportedly, follow NAS's lead and upgrade their own storage protection arrays to 64K-bytes. When they do, all three vendors will again be on an equal footing, at least from a main memory standpoint.

On that fateful day, however, the companies will have jointly reached a storage-capacity impasse beyond which none will be able to proceed without fundamental changes to XA itself, according to computer scientists.

Why does current IBM architecture prohibit the direct addressing of more than 2G-bytes of real storage? the answer lies in the size of the registers that are allowed under XA. Although the registers in IBM-style mainframes are theoretically 32 bits wide, only 31 of them are available for addressing. The remaining bit is reserved by the software for control purposes.

No-one can say

So what does the future hold for XA? What will happen when the technology in all IBM systems has advanced to the point that further refinements become meaningless because their architectural framework is no longer adequate to house them?

Eventually, IBM will be forced to extend its architecture yet again. But by what means the extension will be accomplished — and at what point Big Blue will stake its next addressing boundary — no one can say for sure.

In theory, IBM could circumvent the current 31-bit limit by implementing "shadow registers" and developing an as-yet-unknown kind of software to load and manage them. Under such a scheme, each existing IBM register might have behind it a shadow register, which could hold a certain number of additional bits, according to Carl Amdahl, former designer for Magnuson Computer Systems.

But although the use of shadow registers could undoubtedly overcome XA's existing barriers, the technique would also exact a heavy toll on both price and performance. "The more bits a system's registers contain, the more its hardware costs and the more time it needs to generate an address," Amdahl said. For those reasons, shadow registers remain firmly entrenched in the realm of industry speculation.

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Real benefits with VM

Ultimate Computer's Ian Larkins assesses the potential of VM and Pick on the 9370

VM on the IBM 9370 with create new opportunities to utilise the strengths of the operating system, according to Ian Larkins, formerly VM support manager with Coles-Myer and now IBM product manager with Ultimate Computer.

In its own right VM has never enjoyed wide usage in big IBM shops, Larkins said, because the things for which it is really good — like office automation — are not easy to cost justify.

Larkins also sees the potential of Pick on the 9370 as part of an overall strategy for reducing both the stated and the hidden backlogs in most large DP shops. "For example," he said," it would take, say three years of development effort to build a human resources system running under VM on the 9370 — with Pick, you just select the best available package and avoid the development time and cost.

"Enduser computing, distributed processing, departmental computing — all these have been espoused by IBM for years. But the only IBM solution was the System 3X which could not easily integrate with IBM mainframes. The key to the success of distributed processing using the 9370 is that the distributed box will be the same architecture as the mainframe.

■ *Ian Larkins . . . people will start to see the potential*

"There will be no more need to work around the problem of integrating 'foreign' machines with the 370 architecture with onsite programming effort and the never-ending maintenance of that effort."

Users of a distributed 9370 will have access to applications running on the mainframe with the same ease as those on the 9370. It will be possible to have multiple logical sessions on the same physical terminal using session management software available from IBM such as Netview or third party software such as Pie/VM.

"The biggest surprise I have had, since joining Ultimate," Larkins said, "is the ease with which networks can be set up without high level systems programming. With a 7171 Ascii device controller connecting Ascii terminals to the 9370 you have 3270 capability without having to define a Vtam network.

"The IBM shop managers will be able to provide a lot of function that they could not justify economically, mostly through the use of packages. Even if Pick packages need modification it is with a lot less effort than inhouse development. When people realise the ease of changing Pick systems and understand Pick's flexible data model, they will really start to see the potential of Pick on 9370.

"There are some real benefits that come from running it under VM. For example, VM allows you to have multiple Pick environments on the one mainframe. You can discretely place data on disks using VM mini disks, you can also interleave the data on disk to get I/O spreading capabilities."

"A Pick 9370 will actually support more users than traditional 370 based applications because of the lack of overheads in the operating system. Pick/370 is written in 370 assembler so there is no translate within Pick and the VM microcode assists to enhance the performance of guest operating systems available to Pick."

Larkins believes that planned enhancements such as bridges into traditional IBM products such as DB2 and improved error recovery will increase the potential for Pick to grow into a fully blown mainframe operating system environment. Already there is the capability to use the IUCV capability within VM to talk to other environments. Using channel-to-channel connections would avoid the need for protocol converters when communicating between Ascii and Ebcdic environments.

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Schwab puts DB2 through its paces

IBM's often-quoted Danish benchmark proves suspect

Results from a recent benchmark by US company Charles Schwab & Co show that the IBM DB2's performance as a transaction processor is highly application-dependent and that most cases, DB2 cannot deliver the 62 transaction/sec measured at a Danish bank and often cited by IBM.

In addition, the Schwab benchmark raises the question of how much IBM will be able to improve the performance of DB2 without changing the system's approach to record locking. Schwab MIS officials not only found DB2 limited to 18 transaction/sec for their complicated discount stock brokerage transactions, but they also encountered instances of "severe record locking" as they conducted their tests.

Record locking is one of the undefined limits on DB2's transaction-processing capabilities. DB2's technique of record locking was described by one knowledgeable observer as "crude" and by several DB2 advocates as something that one must design around in application building to avoid performance penalties.

As users move DB2 into heavier production use, the constraint of record locking on transaction processing becomes more acute, users and database consultants said.

IBM said Release 2 of DB2, currently in use, can handle 47 to 50 transaction/sec. for production purposes, but the company has also widely cited the 62 transaction/sec result from a benchmark by Provinsbanken in Denmark. Earlier this year, IBM urged DB2 customers to attend a Danish conference on the benchmark results as a way of learning what can be accomplished with DB2 in a production environment.

The Schwab benchmark, which tested DB2 in a CICS environment on an IBM 3090 Model 200, used the company's established Stock Order Entry system without modification for DB2.

"I'm sure the typical Schwab transaction was more complex than the Provinsbanken transactions," said William Inmon, author of the manual *Building Production Systems with DB2* and a senior consultant with American Management Systems.

Inmon examined the Provinsbanken benchmark and concluded: "The application was very carefully designed, the data was highly denormalised, and the SQL queries were carefully restrained in the amount of data to be accessed." The application executed a simple transaction at a bank automatic teller machine, he said.

The Schwab system in San Francisco is used by brokers taking customer calls to buy and sell stock at a discount. A customer transaction "is not your simple credit card lockup," said Woodson Hobbs, executive vice-president of MIS at Schwab. A typical transaction involved 41 database calls, five or six of which were updates, Schwab officials familiar with the test said.

The brokerage house processes 1.2 million transactions a day, most of them in a 7½ hour period. "We felt that DB2, from an architectural point of view, was what we wanted. But we wanted to make sure its performance was adequate. It wasn't," Hobbs said.

The Schwab benchmark compared DB2 with the database management system Schwab eventually selected, Applied Data Research, Datacom/DB. Both were tested using IBM's Teleprocessing Network Simulator.

Hobbs said IBM representatives assured Schwab that Release 2 of DB2 could handle requirements and that IBM had supplied a team of specialists to gear the DBMS for the benchmark.

Record locking

On the average, Datacom/DB ran at 36 transaction/sec compared with a rate of 18 transaction/sec by DB2. CPU usage was monitored, and Datacom/DB accounted for 15 per cent of CPU usage against 85 per cent by CICS. In the DB2 test, DB2 accounted for 57 per cent of CPU cycles, compared with 43 per cent by CICS, said Kenneth Gladden, Schwab's director of systems testing.

Several observers pointed to DB2's method of record locking as part of the explanation for the difference. DB2 locks what is usually a 4K-byte page each time it accesses a record, preventing another user from accessing the same record or any other record on the page. The page may contain several or dozens of records that are locked along with the one accessed, according to Thomas Sawyer, senior consultant on DB2 operation at Codd and Date Consulting Group.

In addition, DB2 data integrity feature maintains the lock, even after the transaction is completed, until the application finishes its run or until it receives an order from the application to commit all updates and release the locks. The feature allows DB2 to redo any updates that are started but not completed on account of an abnormal ending of an application, Sawyer said.

The first version of DB2 imposed the locks at the start of an application's run and maintained them until the run finished. The second release, which is the one in use, allows programmers to insert commit orders periodically into applications, allowing the records to be released. The change was one of the primary reasons for the performance gains cited in release 2, said While, a DB2 authority and editor of *Info-DB*, a US newsletter.

Inmon termed the locking method "horribly crude" in the first DB2 release and "just plain crude" in the second release. Locking at record level rather than page level is more efficent, he said.

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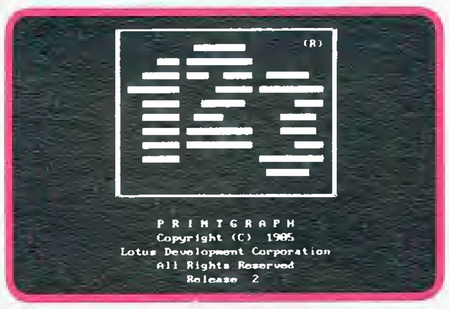

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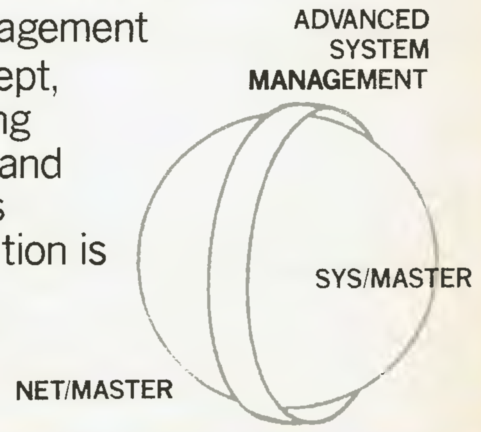

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